BBC · MASTER · ELECTRON · A3000 · ARCHIMEDES JANUARY 1991 £1.60

BBC ACORN USER



HAT TRIX
An intriguing new game that could go to your head!



BE A WINNER!
Taxan monitor and Jet Set pack prizes in two competitions



FLEXIFILE
We delve into Minerva's database management program



OUT OF EXILE
Puzzled by the Exile game? Our series maps out the solution

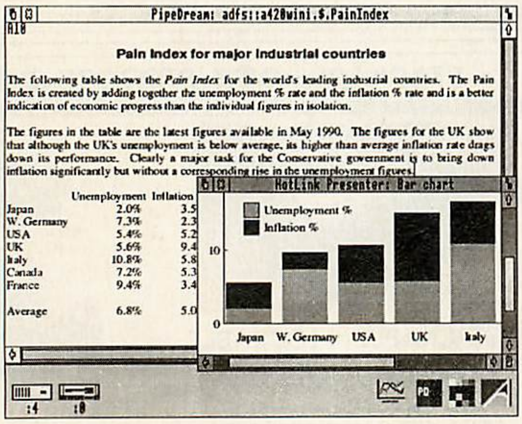


FIRST STEPS
Start collecting our monthly series on using the BBC A3000

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PIPEDREAM 3

WINNER
of the 1989/90 BBC Acorn User Award for Best 32-bit Business Software



The bar chart in the screen shown above was produced by using the HotLink between PipeDream 3 and HotLink Presenter.

Major features include:

- intuitive RISC OS user interface
- many documents loaded at once
- display and printing of pictures within text
- wysiwyg display including all RISC OS fonts
- built-in 93,003 word spelling checker
- file compatibility with PC & Z88 PipeDream & BBC View Professional
- natural, background recalculation
- keystroke compatibility with Z88 & PC PipeDream
- Z88 filing system
- automatic loading of VIEW, ViewSheet, Lotus, First Word Plus, Tab and CSV files
- automatic saving of VIEW, Lotus, Tab, CSV and Acorn DTP format files
- multi-field sorting
- 62 spreadsheet and database functions
- external references between documents for 3-D modelling
- macro file recorder
- slot protection

colton software

PipeDream 3 breaks down the barriers between word processor, spreadsheet and database. With PipeDream 3, you can include numerical tables in your letters and reports, add paragraphs to your spreadsheets, and perform calculations within your databases.

PipeDream 3 has been written to take full advantage of RISC OS – if you can use RISC OS, you can use PipeDream 3. It is fully multi-tasking and multi-windowing, so you can work on many documents at once and instantly move information between them. PipeDream 3 can automatically load and save most popular file formats and is the first program to use the new RISC OS HotLink, which enables it to interact dynamically with Archimedes graphics programs, such as *HotLink Presenter* from Lingenuity and *GraphBox* from Minerva.

As well as winning the 1989/90 BBC Acorn User Award for Best 32-bit Business Software, PipeDream 3 was runner-up in the Best 32-bit Educational Software and Best 32-bit DTP/Word Processor categories.

PipeDream 3
Breaking down the barriers

POWER • SPEED • FLEXIBILITY • EASE OF USE

PipeDream 3 is for all Archimedes computers with 1Mbyte or more of RAM, including the A3000.

For a free brochure, see your Archimedes dealer, or phone us on 0954 211472, or return the coupon.

PipeDream 3 costs £147.00 + VAT.

For a free brochure, complete and return this coupon to the address below.

PipeDream 3 ☐ View Professional ☐

Name

Address

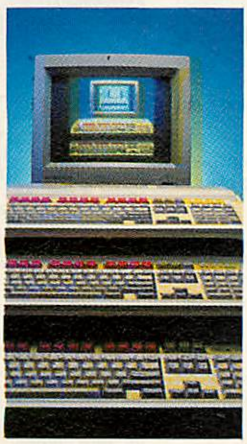
Post code

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Broadway House,
149–151 St. Neots Road,
Hardwick,
Cambridge CB3 7QJ,
England.
Tel. 0954 211472 Fax. 0954 211607.

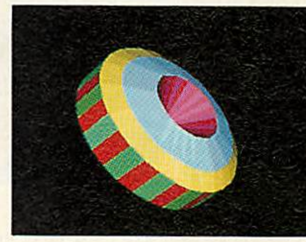
All trademarks acknowledged.

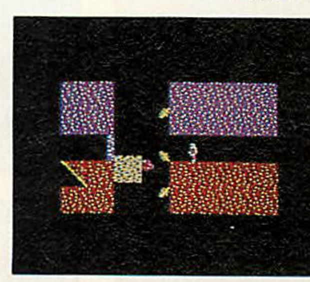
BBC ACORN USER

JANUARY 1991 ISSUE No 102



Cover photograph by John Barlow







A3000
ARCHIMEDES
BBC B/MASTER
ELECTRON

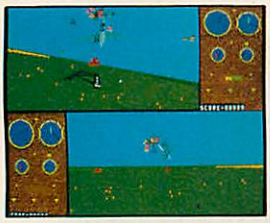
THE 4TH

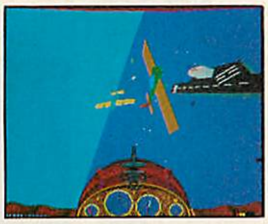


Chocks Away is flight simulation the way you've always wanted it. It has everything for the beginner and the expert:

- Beautiful solid 256 colour graphics and 'nerve shattering' digitised sound effects.
- You pilot a very easy to fly, yet highly manoeuvreable bi-plane - ideal for all ages and skill levels.
- Revolutionary 2 player option using split screen display. This allows 2 players to each fly their own planes simultaneously in practice or on missions.
- Full joystick, dual joysticks, mouse and keyboard control options.
- Amazing "Black Box Flight Recorder" included so that you can record your own flights and then save and replay them.
- Learn landing, loops, rolls and other stunts the easy way by watching the 90 minutes of totally absorbing pre-recorded training flights included with the game.
- Powerful 30mm cannon capable of very rapid fire and long range destruction.
- Easy to read instrument panel and simple controls so you can concentrate on developing your flying skills.
- Internal and external views of your plane can be selected at any time from front, rear, left and right.
- 3 very varied immense maps to explore - approximately 18000 km² in total (6000 km² per map).
- 20 fascinating and varied missions of increasing complexity are included to guarantee weeks or even months of enjoyment.
- Promotion system from Cadet status right through to Marshal of the RAF.
- Realistic take-off and landing from runways and aircraft carriers.
- Special 2 player dogfight feature where your only aim is to shoot down your human opponent.
- Superb range of targets and enemies including bombers, triplanes, powerful fighters, tanks, ships, control towers and anti-aircraft guns. Up to 7 aircraft can be in a single encounter.
- Beautiful scenery including bridges, churches, houses, rugby pitches, warehouses, lighthouses and trees.
- Permanent high-score table which is saved automatically to disc.

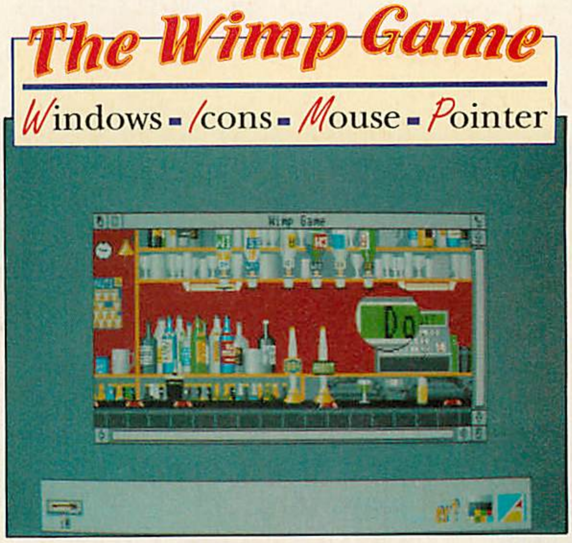
Price: A3000/Archimedes £24.95











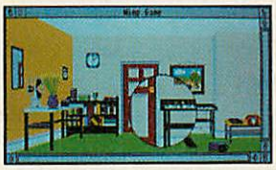
The Wimp Game is a brilliant pointer driven graphic adventure celebrating over 10 years of Acorn Home Computers. This revolutionary multi-tasking game is unlike any other game produced for the Archimedes and even allows you to run other programs whilst you play it.

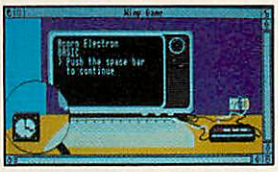
Work your way through the very different and very detailed locations using your pointer to try out the many objects and your magnifying glass to examine them.

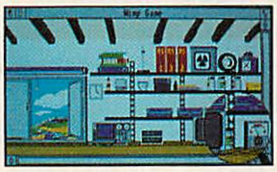
The Wimp Game has no time limit, no help, no hints, no score, no little green men, no space ships, no bombs and no guns. No keys on the keyboard are used. Your aim is to progress from being the owner of an Acorn Atom to being the owner of an Acorn R200 workstation - who said they'd already got one?

You can click on some objects and drag others about - click on the light switch in the first room and you'll see how it works. The 'adjust' button on the mouse will activate the magnifier to let you examine the scene in more detail. Be careful where you click - anything which hurts in real life will probably also do so in the game.

Price: A3000/Archimedes £19.95

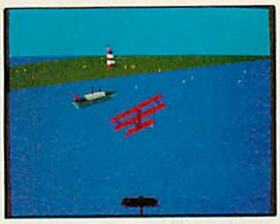










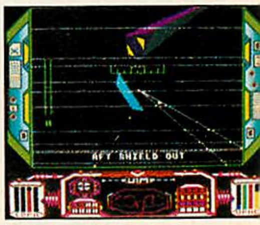


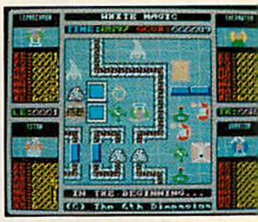


This 4 game collection really is The Real McCoy. These are genuine top games in their original format with full instructions. The games have been carefully selected for variety and include a thinking game, a sports game, a role playing adventure and an arcade game. Bought individually they would cost £81.80p making this a very prestigious special edition collection.

U.I.M. (RRP £29.95)
U.I.M. (Ultra Intelligent Machine) is a futuristic action adventure set in the oceans. It is a huge game featuring solid 3 dimensional graphics and digitised sound effects. You must travel the oceans in your highly expandible submarine visiting the numerous ports throughout the ocean networks. As well as gaining combat skills you'll need to learn to trade in commodities, shares and currencies. There are over 250 missions to complete before you will find your goal - the U.I.M. - created to be almost a god.

Price: A3000/A





A3000/Archimedes Games and Prices

Chocks Away	24.95	UIM (3D Action Adventure)	29.95
The Wimp Game	19.95	E-Type (3D Car Racing)	19.95
The Real McCoy	29.95	E-Type Designer	16.95
Dropship	19.95	E-Type Extra 100 Miles	16.95
Break 147	24.95	White Magic (Arcade Adventure)	19.95
Nevryon (Pure Arcade Action)	19.95	White Magic 2 + Designer	19.95
Pysanki (Arcade Adventure)	19.95	Arcade Soccer	19.95
Inertia (Isometric Action)	19.95	Holed Out (3D Golf)	19.95
Apocalypse (3D Mega Game)	29.95	Holed Out Extra Courses 1	16.65
The Olympics (6 Events)	19.95	Holed Out Extra Courses 2	16.95
Man-At-Arms (Arcade Adventure)	19.95	Holed Out Designer	19.95

All the above Archimedes games will work on the Archimedes A3000, 310 and 400 series

BBC & Electron Games	BBC B and Master 51/4" Disc	BBC and Electron Cassette	Master Compact 31/2" Di
UIM (3D Action Adventure)	19.95	-	21.95
E-Type (3D Car Racing)	14.95	9.95	15.95
Inertia (Isometric Action)	12.95	9.95	13.95
Nevryon (Arcade Action)	14.95	-	15.95
White Magic (Arcade Adventure)	12.95	9.95	13.95
White Magic 2 + Designer	12.95	9.95	13.95
Arcade Soccer	12.95	9.95	13.95
Holed Out (3D Golf)	14.95	12.95	15.95
Holed Out Extra Courses 1	11.95	9.95	12.95
Holed Out Extra Courses 2	11.95	9.95	12.95

All the above BBC games are compatible with BBC B, B+ & Master Series Compute

DIMENSION

A3000 ARCHIMEDES BBC B/MASTER ELECTRON



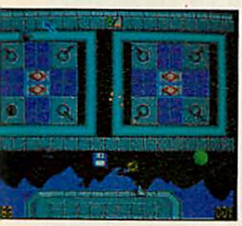
ARCADE SOCCER (RRP £19.95)
rcade Soccer really is WORLD UP FOOTBALL ACTION at its very est. Using an overhead view to nake gameplay as exciting as ossible it features everything that ou could want in a football game.

WHITE MAGIC (RRP £19.95)
/hite Magic is a unique arcade dventure in which you control 4 aried adventurers:- A eprechaun, Titan, Warrior and nchanter.
ou can transform between all 4 haracters at will and use their nuch needed special abilities. /hite Magic is not a game for the aint-hearted; it is a fast-action ame which requires fierce hand- o-hand combat and frantic eapon fire.

UAZER (RRP £11.95)
uazer is a fast action arcade yle game with excellent music, ound effects and graphics. It has 1 incredibly detailed and varied ertically scrolling levels filled with ne most amazing assortment of addies you are ever likely to see.

edes £29.95





DROP SHIP



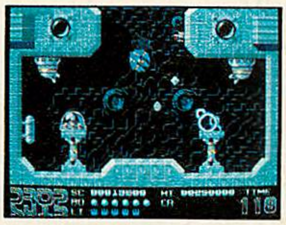
Drop Ship is one of the smoothest and fastest arcade games you are likely to see. It features superb 256 colour graphics, 15 increasingly large and diverse stages and an excellent stereo soundtrack.

The year is 2020....
The government proudly announces that the new fast breeder farm on the Mars colony is completely computer managed and totally safe, defended from attack at all times by a fully-automated tactical defence system.

The year is 2030....
Earth receives a transmission from the Mars colony. The radiation seems to have affected the management software at the fast breeder farm. The defence systems have gone haywire and the whole farm is rapidly approaching meltdown. If all the reactors are not shut down the Mars colony will be wiped out....
Shut down can only be achieved by removing and collecting the power crystals from each reactor. An almost impossible task made even harder by the fact that the defence systems are blowing away anything that moves. The defences include gun emplacements, artificial gravity generators, sporers and hoards of deadly aliens.
What is needed is a craft which is supremely manoeuvrable, capable of great speed and possessing awesome firepower, and a pilot of extraordinary bravery to fly it.
The craft is the Drop Ship.....
The pilot is You.....

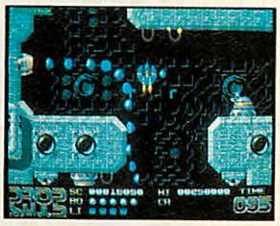
MORE GAME INFO
Frame rate: 50 frames per second
Maximum objects on screen: 150 per frame
The game features completely custom-written screen handling routines
No use whatsoever is made of the operating system routines
The ship movement in the game is accurate down to 0.0001 of a pixel

Price: A3000/Archimedes £19.95









BREAK 147



By any measure snooker is one the most popular sports in the world today. Break 147 has been precisely designed exclusively for the A3000 and Archimedes computers to be as close as is possible to the real game itself.

Break 147 is a full 3D snooker simulation with superb solid graphics and brilliant digitised sound effects, speech and music. The game is controlled exclusively with the mouse.

It features incredibly realistic interaction between the balls and precise control of the cue ball - topspin, backspin, stun, screw, drag, swerve and masse shots. You can view the table from ANY angle or distance even as the balls are moving.

All the rules are fully implemented and you can play matches (against friends or computer players), trick shots or just practice. You will not only be able to replay your last shot but you can also replay whole frames and move in and around the table as you watch it. Highest breaks are saved automatically to disc.

You can even create and edit your own tables so you can design your own trick shots or set up your preferred practice positions. A manual is supplied with each game which gives the fascinating history of snooker and all the rules and instructions required to play BREAK 147.

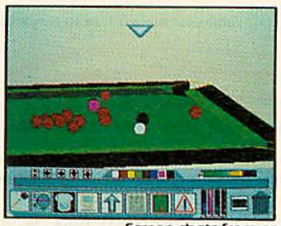
RELEASE POSTPONED
Expected new release
March - May '91

You will find that the game plays as if you were on a real snooker table with all the attendant features to take care of, but with a lot of the tedious parts - such as resetting the table, respotting the balls and scoring - maintained by your computer.

Win a Superb Engraved Trophy
This unique competition allows everyone who obtains a break of 100 or more to win a superb engraved snooker figurine on a solid marble base.

There's also a superb 16" trophy (to be engraved with the winners name) which will be awarded to the first entrant to achieve the maximum break of 147. Full details and entry coupon are included with the game.

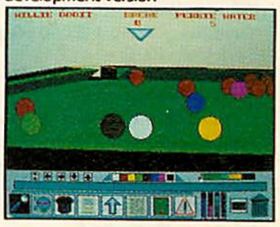
Price: A3000/Archimedes £24.95
Anticipated Release Date: Mid November '90





Screen shots from early development version





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APPLE EMBRACES ACORN WITH 'OPEN' ARM

Acorn and Apple Computer have joined forces to launch a new £5 million company to develop Arm technology.

Called Advanced Risc Machines (Arm) Ltd, the company will be owned by Acorn, Apple Computer and the chip manufacturer, VLSI Technology.

The intention is that Arm Ltd will operate with 'open' processor architecture, acting as a partner in the European Open Microsystems Initiative.

Based in Cambridge, Arm Ltd will employ most of the Acorn design team responsible for the Risc processors used in the Archimedes range.

Announcing the launch of Arm Ltd, Sam Wauchope, Acorn's managing director, said: 'The Arm architecture, developed by Acorn, has been implemented over the last five years, using VSLI's design and manufacturing expertise. This proven technology and product base will be the foundation of Arm Ltd's plan.'

Acorn and Apple have both invested £1.5 million in the new company. Acorn will effectively lose £250,000 per year from chip royalties, but Apple's 'approval' of the Arm chip will boost Acorn's credibility and bring the Archimedes closer to the mainstream market.

Freed from the distraction of chip design, the company can now concentrate on building and marketing its computer range.

Apple has a track record of investing in companies which offer technology that it needs. Both Adobe (Postscript) and Sybase (database software) are previous beneficiaries.

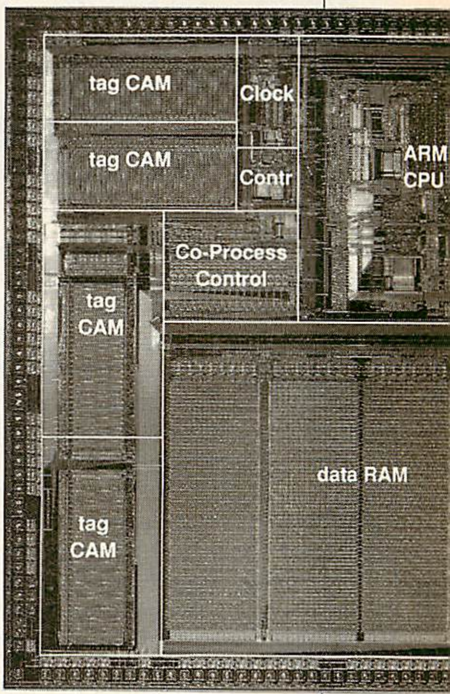
● So how will the new company affect the product lines of both Acorn and Apple?

There are no signs that Apple will replace the Motorola 68000 family of chips in the Macintosh range with the Arm. Apple's vice president, Larry Tesler, stressed the low power consumption of the Arm, as well as its low cost and high performance. This makes it attractive for a portable non-Mac machine – possibly from Apple subsidiary, General Magic.

This is rumoured to be similar to the Active Book Company's notebook-sized portable, already being developed in Cambridge using Arm.

There are many likely advantages for the future of Acorn and its products. Faster and cheaper chip developent will speed the introduction of the next generation of machines

Apple's approval for its technology should increase Acorn's presence in the market.



BAU NOW PRODUCED ON ARC DTP

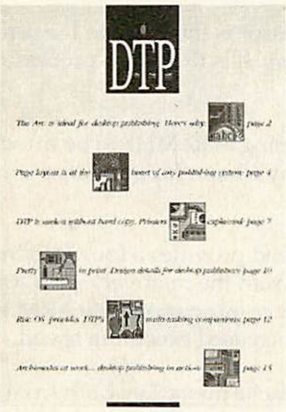
Already the first magazine to produce editorial supplements using Archimedes-based desktop publishing, *BBC Acorn User* has extended DTP to editorial pages of the main magazine.

Starting this month, pages of *BAU* are being produced using a DTP system based on Archimedes 440 computers and *Impression 2* software.

'We are delighted to be the first newstrade magazine to 'go live' with Archimedes-based DTP. This initiative underlines the magazine's continuing commitment to the Acorn market. Future issues will be a showcase for what can be achieved with the machine and its supporting hardware and software,' said *BAU* editor, Barry Monk.

The two supplements – covering DTP and business applications on the Arc – were produced in conjunction with Acorn and other leading software houses.

They were welcomed by both



Acorn suppliers and *BAU* readers alike – to the extent that thousands of extra copies were requested after they were published with the magazine.

Archimedes A440 computers and Taxan monitors are at the heart of *BAU*'s DTP system, but the former will soon be replaced by new A540s.

Computer Concepts' *Impression 2* is the software in use, with LaserDirect and Integrex ColourCel printers being used for outputting pages.

● The first main magazine pages to be produced using the DTP system include our new series, 'First steps on the A3000', which starts on page 71. Progress to a fully DTP-produced magazine will take place over the next two issues.

LOW PRICED 42Mb DRIVES

A new 42Mb removable hard drive, originally designed for the Apple Macintosh, is now available for the A3000/Archimedes.

Norwich Computer Services is now selling the 42Mb removable SCSI hard drives for £680.

Thanks to various SCSI interfaces, the drive offers:

● Average access time of 25ms.

● Reliability, already proven in the Apple marketplace.

● Robustness – the discs, when not in the drive, are said to be extremely robust (one thrown across the Norwich Computer offices apparently didn't have a single error when verified!).

For further information, contact Norwich Computer Services, 18 Mile End Road, Norwich. Tel: (0603) 507057.

Editor Barry Monk. **Production Editor** Pauline McLernon. **Technical Assistant** Paul James. **Education Editor** Lisa Hughes. **Advertisement Manager** Duncan Pringle. **Sales Executives** Richard Power, Matthew Thistle. **Ad Production** Fiona Andrews. **Production Manager** Jennifer Jeffrey. **Publisher** Seamus Geoghegan. **Publishing Director** Michael Potter. **Editorial Director** Christopher Ward.

ABC Member of the Au Bureau of Circulat

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ARC ENTERS THE NUCLEAR FORUM



With interactive video becoming more widespread, a new system based around a BBC A3000 looks set to encourage interest in the nuclear debate in schools.

Produced by Eltec Computers in conjunction with the British Nuclear Forum, the system – which is claimed to be the cheapest of its kind available – includes:

- A 2Mb BBC A3000.
- A Philips Laservision 406 disc player.
- Allied Interactive genlock.
- A set of three double-sided science and maths discs.

The discs have been designed for secondary schools by the Interactive Learning project at the School of Education, Newcastle University.

They cover the National Curriculum up to GCSE level and have been tested over the past year in 70 schools throughout the UK.

The subjects dealt with include energy, radiation, statistics and probability.

The Eltec/BNF system costs £1899. For further details contact the British Nuclear Forum, 27 Buckingham Gate, London SW1E 6LB. Tel: 071-828 0116.

SAY CHEESE!

Fancy a slice of Stilton this Christmas? If so, Topologika – the Stilton-based software house – is repeating its Port and Stilton Christmas raffle.

If you order one of the company's adventure games – *Countdown to Doom, Philosopher's Quest, Kingdom of Hamil*, etc – before December 31, you will be entered into the prize draw. The games are available for the BBC/Master and A3000/Arc.

- Meanwhile, Topologika and Leapfrogs are now making their five *Art Machine* titles available separately.

MASTERS MOVE LEGO

Over £7000-worth of BBC Master 128 computers are being used to 'drive' the Lego Motor Show, Auto 2000, at London's Science Museum.

Acorn has contributed 10 Masters which are being used by visitors to activate and control a collection of small Lego vehicles in the 'Motor Move' section, via a basic form of control programming.

The programme is just one of a range of Lego systems that are available to schools as part of Lego Dacta.

As well as offering visitors the opportunity to design, build and move their own vehicles, the show also allows them to view the impressive range of 17 Lego concept cars.

When the exhibition closes next March, the museum hopes to use the Masters in the Launchpad gallery, an interactive area where children of all ages can carry out their own experiments.

Around 40 BBC and six Archimedes machines are already in use at the museum.

The Science Museum is at Exhibition Road, Kensington, London SW7 2DD. Tel: 071-938 8000/8080.

DISC FOR KIDS' HOMES

A joint venture between Acorn and a Cambridge children's home could provide computers for other similar homes.

It is the initiative of Adrian Critchlow, from Acorn's marketing department, and Danny Williams from the Hawthorn children's home in Cambridge.

Adrian and colleagues at Acorn have compiled a special Christmas games disc, which they aim to sell to raise money for various homes.

Around 2500 discs have been duplicated and money from their sale should provide enough machines for children's homes in the East Anglia area. If successful, the scheme may go national. Acorn is giving machines at a discount to support the project.

Contained on the disc are:

- *!Tetris* – a new version of the arcade-style game.
- *!Crimbo90* - a Christmas raytraced backdrop with a Christmas theme.
- *!Deskduck* - an amusing desk icon featuring a swimming duck.
- *!Barmaze* - a maze game.
- *!Mood* - an icon that reflects your mood.
- *!Billion* - an adventure game that has a different game every-day for at least 200,000 days!



The 3.5in A3000/Archimedes disc is available by sending £5 (cheque /POs payable to *Christmas disc offer*) to The Christmas disc offer, PO Box 400, Cambridge CB1 2AE.

For further information about the project, contact Adrian Critchlow at Acorn Computers on (0223) 245200.

NEW PACKAGE FOR BUDDING SONGWRITERS

Songwriter is a new program from Witney-based Algorhythm Software that lets you print conventionally-notated music and lyrics to a dot-matrix printer connected to a BBC B micro.

Files are compatible with wordprocessing software, such as *View* and *Wordwise*.

A feature of *Songwriter* is that the metric layout of each measure – bars per scoreline and scorelines per sheet – are derived automatically. So it is easier for the user to achieve a musically correct layout.

A text editor allows editing of source files, with immediate graphic confirmation.

Written in assembly language, the program takes under two seconds to layout a score line from 'clean' data.

Songwriter comes as a single 16K Rom chip, which plugs into a spare socket within the computer. It costs £49.50 including user guide from Algorythm Software, 33 The Willows, Witney, Oxon OX8 6HN.

PRINTER DRIVERS

Acorn has released an upgrade (release 2) for its printer driver.

The main improvement is in text printing. A special 'fancy' text file format is provided for underlining, subscript, superscript, bold, light and so on.

The printer driver also lets you put a title on each page and/ or the number of lines when printing fancy text. A simple file will come out as fancy text, but the special features can be turned off, so you get the same sort of output as with the original printer drivers. Acorn Computers is on (0223) 245200.

NEWS IN BRIEF

● If you have been following our *Picpac* series and have had trouble running (*Pagemak*), you may like to know that raising PAGE &300bytes (PAGE = PAGE + &300) will allow the program to work.

● A category for the best use of technology attracted 20,000 computer-generated entries for the Acorn-sponsored Royal Mail letter writing competition.

Prizes of equipment worth over £16,000 were awarded, including three A3000s for the winners' schools.

● 'Powerful open systems workstations at affordable prices' is how Acorn product manager, David Winch, described the benefits of Risc technology to the recent Open Systems conference at London's Olympia. Using Acorn's R140 and R200 series, Winch proved the concept of one workstation per desk to delegates.

● Techsoft will be showing version 3 of its *Designer CAD* draughting package for education at BETT 91.

● Stirling University is to be a reference site for Acorn-based computer solutions for social sciences and policy studies. Acorn has jointly funded development at Stirling to create two showcase teaching labs with Archimedes and Unix machines.

'As well as providing a showcase for Acorn computers, Stirling will evaluate new products in a demanding teaching environment,' said Frank Burdett, Acorn's advisor for higher education.

● The Electronic Font Foundry has released a range of non-Roman typefaces including Latin, Greek, Hebrew and Arabic. Contact EFF on (0344) 28698.

DIARY DATES

January 16-19. BETT 91, Barbican, London. For free tickets call 071-404 4844.

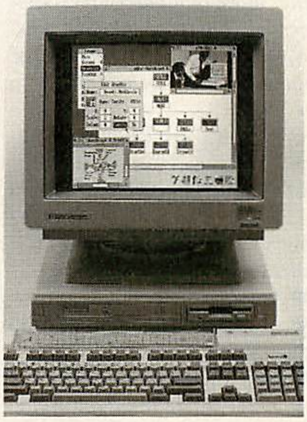
NEW TRAINING SYSTEM

Acorn has joined forces with Westland System Assessment to produce a new multi-media system for the training market.

Called the Academy Multi-Media System (AMS), it combines the Archimedes A540/A400 series computers with *Avanti*, Westland's computer based training (CBT) authoring software.

Aimed mainly at training managers, systems houses and producers of authoring materials and courseware, AMS is said to provide a complete multimedia environment which can be tailored to meet most CBT requirements.

According to Acorn, the AMS package – expected to cost around £5000 with the A540 – offers performance and price which is around £1500 ahead of the competition in this area of the marketplace.



Acorn's marketing director, Mike O'Reardan, said: 'AMS delivers solutions you cannot get in the MS-Dos world.'

The comprehensive range of media available with AMS enables information to be presented in a truly multi-media environment.

Video disc, CD-Rom, audio digitiser, scanner, animation and video image capture can all be used in any combination and incorporated into an overall training strategy.

AMS courseware can be run on any Archimedes A540/400 or A3000 machine. *Avanti* takes full advantage of Risc OS multi-tasking and the video circuitry of the A540 makes it possible to support a range of monitors, including VGA and Super VGA.

'We chose Acorn computers as the hardware component of AMS for their combined power and ease of use,' said David Wright, general manager of Westland System Assessment.

Enquiries about AMS to Warwick Hirst at Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN. Tel: (0223) 245200.

NEW COLOUR DIGITISER

Prism RT is the name of Watford Electronics' new colour digitiser board.

Offering the facility to take colour images from a video camera or recorder, the new digitiser attracted considerable attention at the recent Watford Electronics open day.

Image resolution is 512 x 512, with over 65,000 colours on offer. Up to four images can be stored at once.

The Prism RT board will fit into any Archimedes with a single width podule slot, including an A3000 fitted with Watford's podule racking system.

Storage of 0.5Mb is standard, although there is optional expansion to 1Mb. There is software control of brightness, contrast and saturation.

Prism RT costs £259 and is available from Watford Electronics, Jessa House, 250 High Street, Watford WD1 2AN. Tel: (0923) 37774.

THUMBS UP FOR DATABASE

Dataking, a database package designed for children, is now being marketed following a universal thumbs up from teachers in South London.

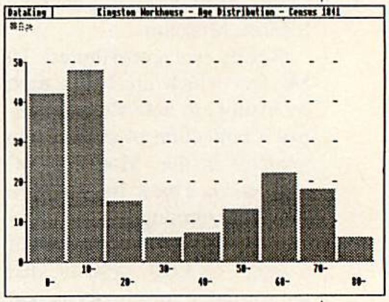
The database has gone several steps further than those programs presently on offer for the Archimedes.

It is a menu driven package which can be used in most curriculum areas in primary and secondary schools. It also helps teachers control the mass of information that they need to store and rearrange.

It can be run on A3000/Archimedes and BBC B/Masters, so schools with a mixture of equipment can make use of the package.

Dataking creates files by first asking for the number and titles of the fields and then for the data itself.

Unlike some databases, you can later add or delete entire records and fields, as well as



change their order. Calculation is dynamic, as on a spreadsheet. Graphics range from pie charts and histograms to bar charts.

The package can be run at three levels of difficulty. *Dataking 1* is suitable for primary schools, and is available on the same disc, as is *Dataking 3*. This can be used if the file becomes too large for the computer memory – unlikely on the Arc, but useful for BBC B owners. Cycling through levels 1 to 3 is easily done by pressing the space bar on the first menu.

For further information contact Brian Durrant, Shenley Software, 5 Coobefield Close, New Malden, Surrey KT3 5QF. Tel: 081-949 3235.



The Oak A3000 monitor stand and expansion bridge provide an attractive, convenient and robust upgrade path for A3000 owners.

The expansion system sits on top of our popular monitor stand which bridges the A3000 whilst still allowing access to the mains switch, disc drive and reset button. It is of strong steel construction and exudes the quality you have come to expect from Oak.

The expansion bridge provides scope for a wide range of add-ons with provision for floppy drives, up to 400Mb of SCSI winchester storage and even tape backup.

A hefty switch mode power supply is fitted and the whole unit is cooled by a 12V DC brushless fan, essential for reliable operation of winchester drives.

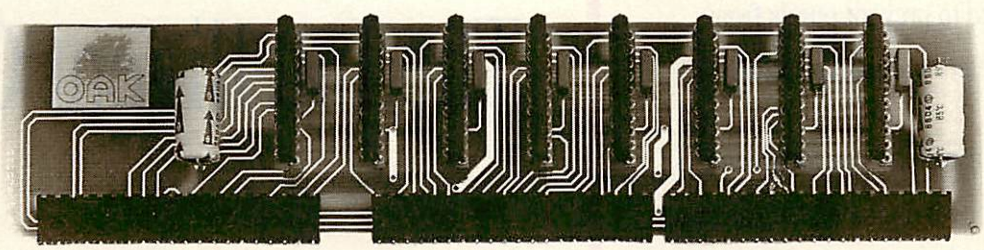
A3000 Expansion System

from £35 + VAT

OAK

To really make the most of your A3000, you need more than the basic 1Mb of memory.

3 versions are available; an upgrade to 2 Mb, a 2Mb card which is upgradable to 4Mb, and the full 4Mb card.



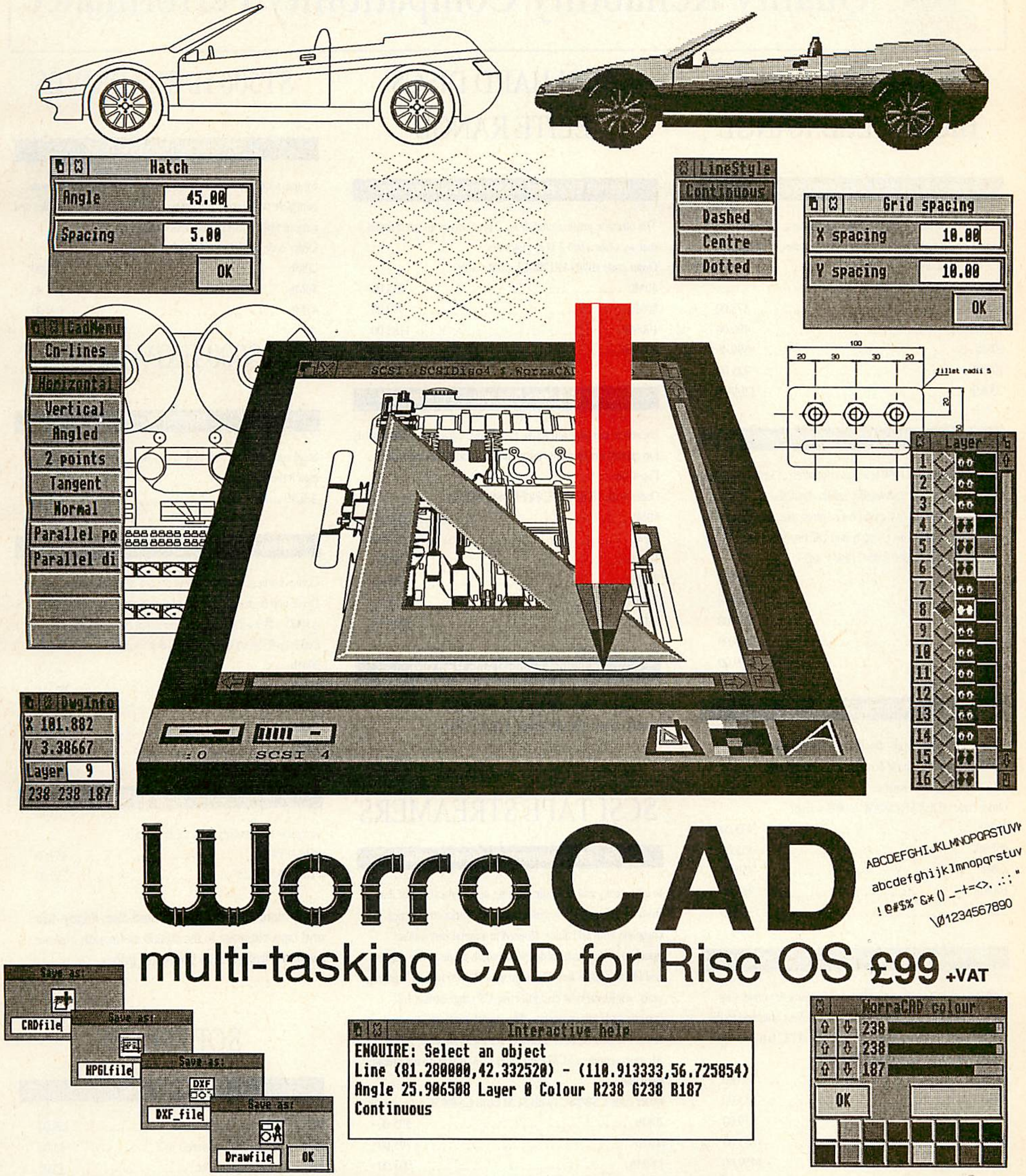
The Oak A3000 RAM card offers an increase in memory to 2Mb or a full 4Mb, to greatly enhance the usefulness of the machine.

The RAM card has low power consumption and gives off a minimal amount of heat so that reliable operation is ensured. It is easy to fit, and no soldering is required.

As with all Oak products, the card is manufactured and tested under a zero defect quality control regime to ensure the ultimate in quality.

2Mb	£65	+ £3 p&p + VAT
2Mb upgradeable	£85	+ £3 p&p + VAT
4Mb	£235	+ £3 p&p + VAT

A3000 RAM Upgrades


Hatch
Angle 45.00
Spacing 5.00
OK
LineStyle
Continuous
Dashed
Centre
Dotted
Grid spacing
X spacing 10.00
Y spacing 10.00
OK
CadMenu
Cn-lines
Horizontal
Vertical
Angled
2 points
Tangent
Normal
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Parallel di
fillet radii 5
Layer
DwgInfo
X 101.882
Y 3.38667
Layer 9
238 238 187
SCSI 4
WorraCAD
multi-tasking CAD for Risc OS £99 +VAT
ABCDEFGHIJKLMNOPQRSTUV
abcdefghijklmnopqrstuv
\Ø1234567890
Save as:
CADfile
HPGLfile
DXF_file
Drawfile
OK
Interactive help
ENQUIRE: Select an object
Line (81.280000,42.332520) - (110.913333,56.725854)
Angle 25.906508 Layer 0 Colour R238 G238 B187
Continuous
WorraCAD colour
238
238
187
OK

BETT 91 PREVIEW

This year's British Education and Training Technology exhibition promises to be better than ever with more exhibitors and a wider range of products. There is also a full seminar programme which will be focussing on technology across the curriculum.

The speakers are from subject teacher associations and they will be discussing a variety of topics, ranging from science and English through to local management of schools.

There will also be representatives of the National Council for Educational Technology. The seminars are free and take place on level nine of the Barbican Centre.

Most of the Acorn exhibitors will be clustered around the Acorn stand in a special 'Acorn village'.

Networking services to all the stands in this area will be provided by SJ Research, so the set-up will be similar to that which you would find in most schools.

The Sherston Software stand is usually so popular that you can't get near it, but if you do manage to fight your way to the front, you'll be able to take a look at *Viewpoints*.

This is Sherston's first purpose-designed Archimedes program. Written by Simon Hosler, it's an adventure/simulation kit which enables users to explore both town and country environments, snapping pictures as they go along, and then storing them on a database.

Viewpoints is aimed at upper primary and lower secondary pupils, but Sherston also has other software for a variety of age-groups.

Longman Logotron will also be showing off its full range of software, including the popular Archimedes *Pendown* and Archimedes *Magpie*. This is a new application which allows you to create 'ring binders' of pages in which you can store whatever material you want.



Divers from Canford School, Wimborne in Dorset, looking for evidence of the effects of fishing, pollution and global warming, are carrying out a survey into the marine life of a local bay. When they surface, the data they have recorded on under water record sheets is fed into a Cambridge Z88 laptop computer. Back at school it is transferred to an Archimedes for processing and report writing. Details of Canford School's marine survey project will be on the Lindis stand at BETT 91.

Folio in many different forms and languages will be featured on ESM's stand.

Other new titles for the Beeb include *Factory*, *Time Traveller* and an Anita Straker program with an intriguing name – *Mathematics From China*.

On the Homerton College stand, visitors will be able to see IT-related Inset material, software for the BBC micro and a new Arc multi-tasking graphics program.

Cambridgeshire Software House has *Continuum*, a curriculum planning, assessment, recording and reporting package, again for the Archimedes.

4Mation is bound to wow people with *Jiglet*, *Jigsaw*, *Snippet* and *Poster*.

The company will also be previewing packages that it is due to be developing over the coming year.

In addition, visitors will be able to meet 4Mation's team of talented programmers who are being flown in from New Zealand especially for BETT.

Taking pride of place on the Beebug stand will be *Ovation*, the company's professional DTP package.

Colton Software will be showing versions one, two and three of *Pipedream*, while Software Solutions will be launching *Genesis 2*, the successor to the original *Genesis* program. And for all you would-be directors, Ace Computing's range of film animation software will be on display.

And, of course, good old *BBC Acorn User* will be there in the Acorn village too.

So many of the magazine's readers are involved in education in one way or another, and the show provides the perfect opportunity for us to meet you (and vice versa), so do pop along to the *BAU* stand, whether it's for some technical advice or simply a chat.

What you need to know is that BETT takes place from 16 to 19 January at the Barbican Centre in London.

For free tickets to the BETT exhibition call 071-404 4844.

NEWS IN BRIEF

● Datalogging equipment manufacturer Philip Harris Education has introduced the Universal Interface, a versatile unit which eliminates the need to buy special interface cards for the different computers in school. Connecting leads are available for BBC B, Master and Archimedes machines. They cost about £10 each. The Universal Interface itself is priced at £125. Philip Harris Education is at Lynn Lane, Shenstone, Lichfield, Staffordshire WS14 0EE.

● Chalksoft has released two more Archimedes/A3000 versions of its popular BBC titles, aimed at ages four to seven. With *Movaword*, children can move words around a colourful screen picture to name each feature in it. When they have finished, the screen comes alive with animation. *Numbers and Pictures* offers a series of lively activities based on counting from one to nine and back again. Chalksoft can be contacted at PO Box 49, Spalding, Lincolnshire PE11 1NZ. Both packages costs £17.

● Two new pieces of software from Hybrid Technology support music education in young and special needs children. *Soundshow* provides over an hour of prerecorded music for listening exercises. It represents each musical item as a pictogram, allowing it to be selected, played, stopped or repeated by a single switch or touch screen. *Soundscore* helps children compose music using a 'graphics score', a visual representation that shows the pitch and length of notes without the complexities of staves.

Both packages are available for the BBC model B or Master, fitted with the Music 5000 Synthesiser and cost £29. Hybrid Technology is at 273 The Science Park, Cambridge CB44WE.

On your marks...



JET SET...



WORTH £750!

Plus 10 copies of Superior Golf for runners-up

You can take off with A3000-based computing by winning a superb Jet Set package in our special competition.

Jet Set is an exciting package put together by distributors, ZCL of Lichfield, in conjunction with Acorn. Based around the BBC A3000, it comes complete with a TV modulator, which allows you to use the machine with a conventional TV screen, giving near monitor quality results (it can be connected to a monitor if required).

Bundled with the new package is some exciting software including:

* *Interdictor*, the amazing flight simulation package from Clares.
* *Euclid*, the 3D modelling program from Ace Computing.
* *Trivial Pursuit* from Domark, the A3000 version of the popular board game.
* *Superior Golf*, the leading golf game from Superior Software.

Also included are the *A3000 Welcome Guide*, the *Risc OS Guide* and the standard A3000 applications – *!Draw*, *!Paint* and *!Maestro*.

As well as the main prize, Superior Software is also offering 10 copies of *Superior Golf* to the runners-up.

How to enter

To enter this exciting competition, all you have to do is correctly answer the three flight-related questions below and complete the tie-breaker. If you want to have a look at Jet Set before entering, simply check the list on the next page for your nearest dealer, where you can see a demonstration.

Jet Set teasers

1. In which year did the Wright brothers fly the first mechanically-powered aircraft?
2. If you were flying at Mach 2, how fast would you be travelling?
3. Birdies, eagles and albatrosses can be found in which sport?

Tie-breaker

I would like to fly with the Jet Set because .... (not more than 20 words).

Please include your answers, the tie-breaker and your own name and address on a postcard and send it to:

Jet Set competition,
BBC Acorn User,
Redwood Publishing,
20-26 Brunswick Place,
London N1 6DJ.

Entries must arrive by Monday, January 21 1991. Employees of Acorn, ZCL or Redwood Publishing may not enter. The judges' decision will be final and no correspondence will be entered into.

GO!

Win the new Jet Set package including:

* A BBC A3000 with mouse
* TV Modulator
* Free software
* Operating instructions



JET SET DEALERS

COMPANY NAME	TOWN/COUNTY	TELEPHONE	COMPANY NAME	TOWN/COUNTY	TELEPHONE
Academy Computer Shop	Inverness	(0463) 711430	Gomer	Brighton	(0273) 728681
Adams World	Enfield, Middlesex	081-342 0240	G A Computers	Nottingham	(0602) 211225
Advanced Computer Centre	Luton, Bedfordshire	(0582) 20604	HCCS Associates	Gateshead	091-487 0760
AJL Electronics	Gloucester	(0452) 311031	Home and Business	Oldham	061-627 0935
Alsystems	Alton, Hants	(0420) 87213	Baker and Hundson	York	(0904) 623840
ANR	Leeds, Yorkshire	(0532) 326341	Kendal Computers	Kendal	(0539) 722559
Arran Computers	Stockport, Lancashire	061-480 3975	LMR	Sale, Cheshire	061-962 8872
ARC Electronics	Wakefield, Yorkshire	(0924) 290388	Le Computer	Chelmsford, Essex	(0245) 362225
Atomic Computer Systems	Burnley, Lancashire	(0282) 54299	Lewis's	Glasgow	041-221 9820
Automatic Services	Walthamstow	081-521 1784	MAV	Reading, Berkshire	(0743) 311177
Alders	Croydon	081-681 2577	Microbridge	York	(0904) 690617
Alpha Microtec Ltd	Solihull	021-745 8998	Maughan Micro's	Gateshead	091-493 2308
Bits and Bytes	Liverpool	051-709 4036	Mighty Micro	Manchester	061-224 8117
Beebug	St Albans, Herts	(0727) 40303	Mauloen Sales	West Midlands	(0384) 371362
Cannon Computing	Bishop Stortford	(0279) 507727	Morley Electronics	North Shields	091-257 6364
CJE Micros	Worthing	(0903) 213361	Minerva Systems	Exeter	(0392) 437756
Calan Craft	Byfleet	(0932) 342137	Mansfield Computers	Mansfield	(0623) 631202
Computereyes	Maidstone, Kent	(0622) 751096	Mr Disc	Birmingham	021-616 1168
Computerwise	Sutton Coldfield,	021-356 9696	Micro Studio	Cambridge	(0353) 720433
Craddock Computers	Northampton	(0604) 760991	Newton & Brewer	Ely	(0353) 666011
Colne Micro	Colchester	(0206) 47242	Northwich Computers	Northwich	(0606) 47883
Cambridge Micro Surgery	Cambridge	(0223) 412658	Orion Computers	Preston	(0772) 42198
Computerworld UK	Bolton, Lancashire	(0204) 495011	Stata Computer Company	Cheam	081-661 2266
Central Studios	Southport	(0704) 531881	SRS	Watford	(0923) 226602
Compleat Computers	Rugby, Nuneaton	(0788) 572309	Spa Computer Centre	Leamington Spa, Warwicks	(0926) 337648
Computer Connect	Ipswich	(0473) 232282	Soft Shop	Chalfont	(0753) 889010
Computer Depot	Glasgow	041-332 3944	Silicon Centre	Edinburgh	031-557 4546
Computatek Ltd	Glossop	(0457) 865953	The Computer Store	Nottingham	(0602) 598645
Computacenta	Derby	(0773) 826830		Leeds	(0532) 429284
Computerware	Bexhill	(0424) 223340		Doncaster	(0302) 325260
Cumbria Software	Brampton	(0697) 73779	Telerents Northern	Morepeth	(0670) 519678
Dabhand	Manchester	061-766 8423	Town Computers	Stoke on Trent	(0782) 287540
D A Computers	Leicester	(0533) 549407	The New Cestrian Software	Chester	(0224) 312666
Data Exchange	Port Sunlight	051-644 7770	TJS	Seaford	(0323) 491352
Data Nest	Leicester	(0533) 539755	Tomorrows World	Hull	(0482) 213385
Data Store	Bromley, Kent	081-460 8991	Taunton Micros	Somerset	(0823) 336118
Daval Electronics	Peterborough, Northants	(0733) 325121	Tiger Software	Dorset	(0308) 27691
Delta PI	Whitby	(0947) 600065	Topsoft	Stockton, Cleveland	(0642) 670503
ECS Computers	Kings Lynn, Norfolk	(0553) 692727	Vector Group Ltd	Tenterden, Herts	(05806) 5811
EDR Computers	Chelmsford, Gloucester	(0245) 266073	Willow Software	Bristol	(0934) 876031
Flagstone Computers	Totnes, Devon	(0803) 865520	We Serve	Hants	(0705) 325354
Yarm Computers	Yarm	(0642) 786922	Wants	Plymouth	(0752) 673211
Grantham Computers	Grantham, Lincs	(0476) 76994	West Devon	Yelverton	(0822) 853434

THE WEAKEST LINK

The weakest link in your MIDI set up is not the musician(!) – it's the MIDI cables. And human nature being what it is, these are usually the last things that we check.

But help is at hand in the form of MIDITEST 5. This small back box contains two MIDI sockets, two sets of six LEDs and a rotary six-position dial.

Plug the ends of the suspect cable into the sockets and turn the dial. The LEDs light up to show which pins are wired together. The sixth LED is connected to the casing.

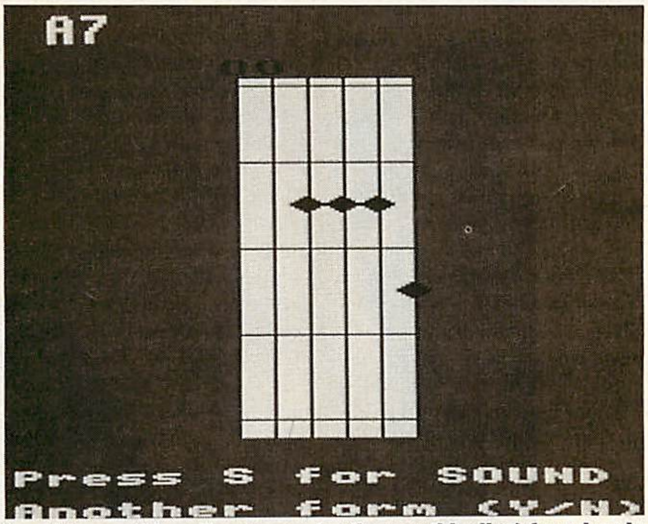
If this lights up, throw the cable away, as otherwise it could produce an earth loop.

You could check the connections with a multimeter, of course, but the MIDITEST 5 is much quicker.

You can also flex the cable to check for intermittent faults which are incredibly difficult to track down.

The only essential pins which must be connected are the three central ones, conventionally numbered, 2, 4 and 5. The outside pins may optionally be connected but not if you're transferring MIDI data from an Atari ST which has a non-standard MIDI Out.

MIDITEST 5 costs £15.50 including p&p from: MIDITech, 176 Burges Road, London, E6 2BS. Tel: 081-552 3434.



See this month's yellow pages (or the monthly disc) for a handy program that will display guitar chords on the fretboard.

GUITAR CHORD CHARTS

BBC Acorn User readers to the rescue! In the November Music column, Trevor Davies asked whether there was a program for setting out chord charts for rhythm guitar.

While no one has come forward with details of a commercial program, Charles Williams of Coventry has written in to say that he has been experimenting with one for a while.

It produces sequences of bars containing chord names and it supports music symbols such as Coda, Dal Segno, repeat bar lines and so on. Charles has very kindly offered to send it to any reader who sends a formatted disc and an SAE to: Charles Williams, 4 Crossley Court, Cross Road, Coventry CV6 5GW. Tel: (0203) 682117.

Charles has also written a program that will display guitar chords on the fretboard using a variety of fingerings. The program will 'strum' the chord in a slow arpeggio using the BBC's sound chip.

It strikes me that this would be an ideal application for the Hybrid Universal.

Charles' chord program can be found in this month's yellow pages. It's fully menu driven and self-explanatory.

POINTS ARISING

● In the September music column I was bemoaning the lack of Archimedes music software. Well, the ubiquitous EMR has recently developed a synth editor suite called *Orpheus* – you may have seen it at the *BBC Acorn User* show.

The basic program costs just £9.95 and you add to this the synth modules you require. Currently available are Roland MT-32 and Casio CZ modules at £29.95 each.

More information can be obtained from Electromusic Research, 14 Mount Close, Wickford, Essex, SS11 8HG. Tel: (0702) 335747.

● Michael Harbour's Hybrid album, *Windy Island* (£4.95 from Hybrid Technology), was mentioned in a previous month's column.

However, I neglected to say that it is the first album to make use of the extra voices on the Music 3000. Is anyone else out there making use of those extra voices?

● Jim Redfarn from Buckhurst Hill in Essex wrote to request a feature on using MIDI with the Music 2000.

This is currently under consideration, but before going ahead with it, I would like to have a little more feedback from some other readers.

What instrument(s) are you using? Have you any hints or tips to pass on? Have you experienced any problems? Letters and comments to me at the address below.

● Reserve your copy of next month's *BBC Acorn User* for a full review of Clare's new *Rhapsody*, a Risc OS compatible music notation program.

Ian Waugh

NEWS IN BRIEF

● Panda Discs has released two new albums for the Music 5000. *Children In Need Volume 2* contains 22 tracks ranging from Jean Michel Jarre to the Hippopotamus Song. There's a music wordsquare, a set of clever graphics routines which you can use in your own pieces and a game called *Sound Field* in which you 'lay' notes on the screen while a ball bounces around the screen playing them. All profits go to charity. *Monster Computations Volume 4* is another disc by Frank Dudley with his now-familiar monster graphics. There are 20 tracks from jigs and hornpipes to traditional and original material.

All Panda discs cost £6, and are available from: Panda Discs, Four Seasons, Tinkers Lane, Brewood, Stafford, ST19 9DE.

● How many music programs are there for the BBC? A new survey from Hybrid Technology has details of almost 60 music programs, most with an educational leaning.

All are compatible with Hybrid's new Music 5000 Universal. The 20-page survey costs £4.30 from Hybrid Technology, 273 The Science Park, Cambridge, CB4 4WE.

● Five major educational music programs have recently been enhanced to take advantage for the Universal.

They are *Rhythm Maker* and *Compose Play* (ESP; tel: ((06020) 295019), *Basic Music Composition* (Tobin Music Systems; tel: (0279) 726625), the *Theory of Music Tutorial* and *Music Questions* (Ted Kirk; tel:(0744) 818761).

If you have any music news, tips or topics you'd like to see covered in this column write to Ian Waugh, BBC Acorn User, *20-26 Brunswick Place, London, N1 6DJ. Of particular interest are Archimedes music projects.*

TAXAN PRESENTS A·SCREEN·LEGEND

Multivision 795 with Trinitron® CRT

Taxan announce the latest addition to our range. A screen star which is destined to become a legend. The new Multivision 795.

This compact 14" auto-scanning colour monitor has already attracted rave reviews. Manufactured in Japan, Multivision 795 incorporates a 0.26mm Trinitron® cathode ray tube, providing a clear, flicker-free image from VGA right up to 1024 × 768 resolution. A versatile little performer indeed.

And if you think that has a touch of style, wait until you see the quality and colour of the picture.

Multivision 795 awaits your audition. Start the cameras rolling by returning the coupon or phone us on **(0344) 484646.**

> Multivision 795 for the Acorn Archimedes now includes a free video cable and a VIDC Enhancer from Atomwide.

TAXAN

A KAGA COMPANY



® Trinitron is a registered trademark of Sony Corporation.



'The greatest picture ever'

To: Taxan (UK) Ltd, Taxan House, Cookham Road, Bracknell, Berks. RG12 1RB. Please send me more information about Multivision 795 and the complete range of Taxan products.

Name ________ Position ________ Company ________

Address ________

____

Postcode ________ Telephone No. ________

ACU12

Please indicate whether you are a Dealer ☐ End-user ☐

or other (Please specify)________

HMSO Public sector customers may purchase from HMSO at preferential prices. Please telephone (0603) 695339 for details.

LETTERS

Send letters to BAU, 20-26 Brunswick Place, London N1 6DJ



KEEP ON RUNNING

I know the old BBC computers don't really stand up to the Arc but there are still plenty of good games kicking about for them – remember those old favourites like *Repton*?

Anyway, I finally went on to an IBM 286 PC. A great machine, and so fast, but the games are dreadful and many won't slow down enough for an old fuddy duddy like me. I know I should have remained with the Arc but I spend most of my life in Africa and nobody there has heard of an Acorn, even of the tree variety!

I would love to continue running the software I have accumulated over the past 12 years, but the nearest I can get to an emulator for an IBM compatible is one that will either just read the discs or run legitimate Beeb Basic – and not that much is written legitimately.

The Beeb only has a tiny memory, 64K including the operating system (PC tools for the IBM refer to this as a 'small amount of space') so why isn't there a complete emulator for the old machine?

Does anybody know of one to help this oldtimer keep running *Repton* in his old age?

R M Barber-Riley
London

As far as we know there are no such emulators. Even the Archimedes has trouble running some BBC games. But you never know, maybe there is some uptapped talent out there who has written such an emulator?

STILL GOING STRONG

I was delighted to note that you will be running a new series designed to give help and information to a complete beginner on the A3000. I am that person. My subscription for next year is already winging its way to *BBC Acorn User*.

I am 70 years of age and some time ago read a magazine article that included the words, 'When the present elderly computer illiterate generation has gone, the real computer revolution can begin to transform the world'.

I was a bit miffed by this statement. The elderly are only computer illiterate because nobody taught them about computers in the first place.

Some time later I found that evening classes in computer awareness were being held at the local comprehensive school, and I enrolled with some trepidation.

The school uses Archimedes computers. With these and a kind patient teacher I explored the mysteries of the computer and became aware of its enormous potential.

Halfway through the course, I found *BAU* at the local W H Smiths and, although I couldn't comprehend it at first, soon lights began to shine through the darkness and it's all beginning to make sense now, thank you *BAU*!

I think the elderly and retired would benefit immensely if they got to grips with computers. What most of us need is mental stimulation and there seems to be a plethora of educational programs for the Arc which do just that. There is also the spinoff of easy communication via fax, modem, etc.

Above all, using a computer is such fun! So come on all you ancients with busy brains, start a new life with the Archimedes.

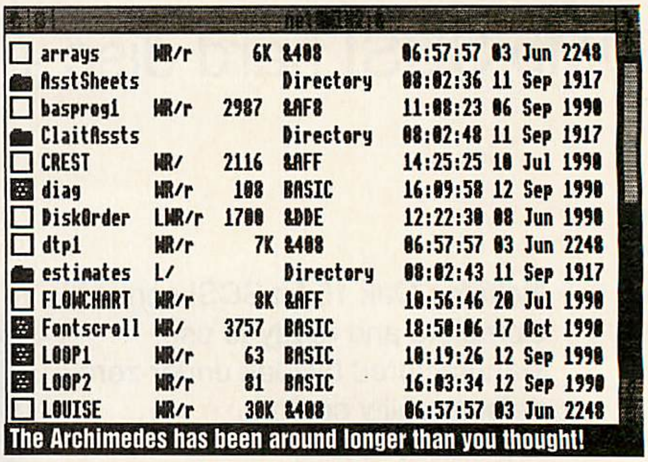
Margret Haedicker
Somerset

TIME TRAVEL

I thought your readers might like to know the full power of the Archimedes in my school. Take a look at the viewer (above) of one of my directories on my SJ network of A3000's.

You will see that in 1917 I created some directories, but more recently in 2248 I saved some files. Over these 331 years I have had little trouble with the system, just the odd mouse button needing replacement.

Seriously though, these dates appeared on the system a week ago during a day of total chaos.



arrays	WR/r	6K	&408	06:57:57	03 Jun 2248
AsstSheets			Directory	08:02:36	11 Sep 1917
basprog1	WR/r	2987	&AF8	11:08:23	06 Sep 1990
ClaitAssts			Directory	08:02:48	11 Sep 1917
CREST	WR/	2116	&AFF	14:25:25	10 Jul 1990
diag	WR/r	108	BASIC	16:09:58	12 Sep 1990
DiskOrder	LWR/r	1700	&DDE	12:22:30	08 Jun 1990
dtp1	WR/r	7K	&408	06:57:57	03 Jun 2248
estimates	L/		Directory	08:02:43	11 Sep 1917
FLOWCHART	WR/r	8K	&AFF	10:56:46	20 Jul 1990
Fontscroll	WR/	3757	BASIC	18:50:06	17 Oct 1990
LOOP1	WR/r	63	BASIC	10:19:26	12 Sep 1990
LOOP2	WR/r	81	BASIC	16:03:34	12 Sep 1990
LOUISE	WR/r	30K	&408	06:57:57	03 Jun 2248

The Archimedes has been around longer than you thought!

Files were refusing to save, then being found in unlikely places, re-dating themselves and occasionally getting their identities completly wrong. This went on most of the day. I checked the clocks in the computers and on the fileserver, but they were correct.

Finally after finding spurious entries on the password file I released the heads on the fileserver and went home for the weekend expecting a total failure when I returned.

On Monday morning, apart from the remains of Friday's madness, nothing was wrong. Files saved happily, correctly dated. The strange entries in the password file had gone.

The only indication that anything was not right before this happened was a repeating floating point error while using *Presenter 2*. I have no idea if this was connected to the other symptoms.

Do any readers have any suggestions as to how to deal with the problem? SJ Research says that it is more likely to be in the computers, but it spread around the net.

The advice, which I am following, is to leave well alone, at least while it is working.

I cannot see how a virus could have got in, since pupils do not use their own discs on the system, and do viruses get better, as mine has. Or has it?

Paul Allen
Basingstoke

If you have several BBCs on your network, your experience would be easy to explain. When an Archimedes reads a BBC file it doesn't have the date information in the right place. Of course, the same happens when a Beeb reads an Arc file.

Instead of the date it reads the file type. This seems to be what is happening here.

It also seems that one copy of the catalogue is incorrect on the fileserver, which is why files turn up in the wrong place.

Also make sure you are using the Archimedes version of *EX. If you are using the Beeb version then *this could also* generate errors.

***Presenter 2* has been known to generate floating point errors occasionally and this is not connected to your network problem.**

PRAISE WHERE IT'S DUE

These days, complaints about suppliers are only too commonplace. It is a pleasant change to report on some excellent after sales service.

Recently, my Rom box from HCR Electronic Services broke down. This was repaired free of charge by HCR which even replaced my chipped mains plug for me.

Congratulations for an excellent service.

W H Edwards
Sheffield

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1170b	Easiword (Minerva)	33.95
1975b	Premier 3 (Circle Software)	70.00
5462b	Premier 3 WP application	23.00
1088b	Protext 5.0 (Arnor)	130.39

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0954b	Intersheet II (CC)	24.95
1084d	Logistix (Acorn)	89.00
1998b	Schema (Clares)	107.35
0931b	Sigmasheet (Minerva)	43.44

DeskTop Publishing

1089c	Desk Top Publisher (Acorn)	125.00
1113c	Impression II (CC)	158.00
1115b	Impression Junior (CC)	89.00
1077b	Tempest (Clares)	125.00
0108b	Ovation (Beebug)	99.00

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0901d	Pipedream 3 (Colton)	125.00

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1913b	DataVision (Silicon Vision)	123.86
1992b	Flexifile (Minerva)	125.95
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1900b	Genesis (Software Solutions)	79.95
5460b	Carousel (for Genesis)	39.95
5448b	Genindex (for Genesis)	29.95
0910b	Knowledge Organiser (Clares)	45.00
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0989d	Multistore (Minerva)	199.95
5447b	Squirrel (Digital Services)	129.00
0921c	System Delta Plus vII (Minerva)	55.00

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5458d	Business Accounts (Minerva)	379.95
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0952b	Corruption	20.61
1979b	Drop Ship (4th Dimension)	16.48
1070b	E-Type (4th Dimension)	16.48
1058b	E-Type Designer (4th Dim.)	14.00
0999b	E-Type Extra 100 miles (4thD)	14.00
1929b	Fireball 2 (CIS)	21.70
0944b	Fish	20.64
1980b	Guild of Thieves	20.65
0964b	Holed Out (4th Dimension)	16.48
0993b	Holed Out Designer (4thD)	16.48
0991b	Holed Out Extra 1 (4thD)	14.00
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1987b	Manchester United	16.48
1903b	Nevryon (4th Dimension)	17.35
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1999b	Pysankie (4th Dimension)	16.48
1994b	Real McCoy (4th Dimension)	24.75
1991b	Redshift (Minerva)	14.83
1122b	Repton 3 (Superior)	16.48
1933b	Rotor (Arcana)	20.70
5451b	Starch	13.00
0990b	Stranded	24.74
1986b	Superior Golf & Construction	16.48
5452b	Superpool (4th Dimension)	17.35
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1981b	The Pawn	20.65
0963b	Thundermonks (Minerva)	12.35
0994b	U.I.M. (4th Dimension)	24.74
1109b	White Magic II+designer	16.48
5453b	Wimp Game (4th Dimension)	17.35
5456b	Worldscape (Eclipse)	17.35
1179b	Zarch (Superior)	16.48



Languages

0938c	ABC Basic Compiler (Dabs)	84.95
0897c	ABX Utils for ABC (Dabs)	44.00
1085d	ANSI C release 3 (Acorn)	128.95
0107c	ISO C Dev. System (Beebug)	77.39

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1091b	Armadeus (Clares)	66.21
0904c	EMR Creations set (6 discs)	43.39
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1971b	EMR MicoStudio	68.70
0995d	Iinspiration (Pandora)	260.00
0239f	Pandora PMI-4 Midi Interface	179.95
1997b	Rhapsody (Clares)	41.36
5457b	Tracker (Serial Port)	41.95

Utilities

1946b	ARC-DFS (Dabs)	24.74
0102a	DFS Reader (Beebug)	9.06
0106b	Hard Disc Companion (B'bug)	33.91
5445b	Investigator II (Serial Port)	24.30
1990b	PC Access (Minerva)	33.91
0796b	Serial Link Disc (Beebug)	15.79
1908b	Star LC10 Colour Driver (Ace)	14.95

CAD

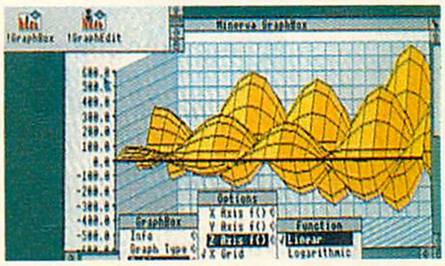
0911c	Autosketch II	75.00
0913c	PCB + autorouting	161.95
1909d	PCB Proffessional	310.95
0959d	P.D.T. (Oak)	349.95
1936c	WorraCAD (Oak)	73.95

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0962b	Atelier (Minerva)	79.95
0937c	Pro-Artisan (Clares)	79.95

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1938c	Mogul (Ace)	19.00
19143b	Poster (4mation)	84.95
1078c	Render Bender (Clares)	58.00
1912c	Solids Render (Silicon Vision)	123.87



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0912c	Graph Box inc Hotlink (Min.)	64.00
0908b	Presenter II inc Hotlink (Lindis)	46.95
5429c	Presenter Story (Lindis)	159.00

Outline Fonts

1920b	Font Starter Pack (Acorn)	40.95
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1922b	Symbol Font Pack (Acorn)	40.95
0111b	Outline Font Pack 1 (Beebug)	47.39

Educational Software

1008c	Desk Top Stories (Resource)	32.95
0935b	Dread Dragon Droom	25.95
1193b	Fun School II (0-6 years)	16.48
1194b	Fun School II (6-8 years)	16.48
1195b	Fun School II (8+ years)	16.48
1150c	Jigsaw (4mation)	29.00

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There is no VAT to pay on books

1211b	Arch Assembly Language	12.95
1246b	Archimedes First Steps	9.95
1243c	Arch Operating System	14.95
1208b	Basic V : A Dabhand Guide	9.95
1245g	RISCOS Prog. Ref. Manual	79.00
1207c	30 Hour Basic	12.95

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A selection of problems from our Post A Problem service



QUESTIONS AND ANSWERS

Q I am planning to use a BBC model B computer to control two stepping motors. Before I begin to plan the circuit, can you offer any advice on custom chips that are suitable for the control of stepper motors and a suitable reference book?

Robert Conroy
Tyne and Wear

A I recommend you include a SA1027 chip in your circuit. It is especially designed for stepper motor control.

One of the best books on the kind of interfacing you are involved in on the BBC micro is *Practical Interfacing with the BBC Micro* by Geoff Bains. This is published by Methuen and its ISBN number is 0 412 27320 9. There is a chapter entitled 'Stepping Out' which deals with the control of stepping motors. The chapter also contains the necessary routines to test and control a robot using Basic and Assembler.

Q I have been using a BBC Master 128 with the Torch Graduate system to run MS-Dos and IBM compatible software for a number of years.

I would now like to add a hard disc to my system. Do you know if this is possible with the Graduate?

Professor D L Clement
Belgium

A Torch is no longer in business and therefore I have been unable to get advice on the possibility of adding a hard disc drive to your system to enable the Graduate and the BBC Master to share a hard disc.

If you are running an Acorn 80186 co-processor with your BBC Master (the 512 board) I can advise you that adding a hard disc is possible and a real boon. The Master 512 uses Digital Research's Dos Plus operating system, which is broadly MS-Dos compatible and I regularly use a hard disc formatted for BBC ADFS and Dos Plus use.

If your Graduate is connected to the Master 128 by way of the Tube interface and your 1MHz Bus is free, I think you could be able to add a hard disc drive. Can I sugget you contact Watford Electronics and see if it has had previous experience of the use of its hard discs with the Torch Graduate.

Q Can you advise me as to the best source of detailed information on developing software for use in sideways Ram on the BBC Master 128?

J E Washford
Stamford

A The best source of detail on sideways Ram is to be found in Bruce Smith's *The Advanced Sideways Ram User Guide for the Master and BBC Computer* published by Victory Books but now distributed by Dabs Press.

Q I am developing a flight simulator program to run on the BBC micro. I feel I could do with some assistance with the writing of the runway algorithm. Can you recommend any packages that I could get into and examine how other software developers have done things?

C Page
Southampton

A Why not have a good look at the way Acornsoft did things in its *Aviator* package. This did have a realistic runway sequence from which you should be able to work out some of your own routines.

Q I have a BBC Master 128 and an Epson FX80 printer and am considering upgrading to a Star XB-2410 printer with the colour upgrade installed.

However, I am somewhat concerned about the suitability of the Star printer for providing colour printouts from Advanced Memory Systems' *Superart* package.

D J Radley
Pershore

A The Master version of *Superart* was produced in 1986 and is compatible with three types of colour printer – Epson, Oki and Integrex. The first two are nine-pin colour printers while the latter is colour ink-jet.

The Epson FX series of nine-pin printers became the standard for monochrome printers and all other makes have attempted to obtain good compatibility. This has, however, not been the same for colour printers. Although the Epson JX range was introduced it has not become the true standard nine-pin colour printer as the mono FX printer did. Probably the most popular nine-pin colour printer was the Star LC-10 which was broadly compatible with the JX.

However, you are con-

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sidering the purchase of a 24-pin printer with the colour upgrade. While it will probably emulate the Epson JX colour printer, I would not like to guarantee that it will print everything you manage to draw, paint and design with *Superart*. At worst it will do a reliable job, but it is a 24-pin printer emulating a nine-pin model of a different make.

Q I have just purchased a BBC model B with a disc interface fitted. Unfortunately, it came without any documentation. Can you tell me the commands for loading programs from cassette?

A D Brisbane
Bridport

A The sequence of commands for loading and running tape based BBC Basic programs with a machine fitted with a disc interface are:

```
*TAPE
PAGE=&E00
CHAIN "program"
```

where 'program' is the name of the program you saved. If you have forgotten the exact name, use: CHAIN ""

Q I own an unmodified BBC model B and want to upgrade the memory of the machine. Some of the graphics programs I have developed seem to run short of memory. What do you advise?

R Chippendale
Barwell

A I think the kind of memory expansion that would suit your needs best would be shadow Ram that would enable you to have the full 32K of memory always available whatever screen mode's in use. Memory hungry modes like modes 0, 1 and 3 leave you with little program storage memory.

A very suitable shadow Ram board is made by Watford electronics and costs between £50 and £85.

Q I am a teacher and I'm about to set a couple of BBC micro system to work on some control technology work in the classroom. I've heard I would be well advised to add a buffer box to each computer before I interface things up. Is this right? Can you recommend any that would be suitable in school applications?

Name and address
supplied

A Educational users should add a buffer or control box for security of BBC circuitry. A number are available:-

In Control from Cambridge MicroTech, Cambridge. Buffer Box from AUCBE, Hatfield. The Banana Box from Castle Associates, Scarborough. Interbeeb from Commotion, Enfield. Control It from Deltronics, Llanelli.

Q I think I ought to upgrade my secondhand tape based BBC computer to disc as I seem to have a lot of trouble loading programs. I get error messages like 'Bad Program' or 'No Room'. Could you tell me what these messages mean and why they are occurring?

G Sabre
Huntington

A The 'Bad Program' message would indicate that the program stored on tape has been saved badly or you are trying to load the program with the tape recorder settings slightly wrong.

The 'No Room' message could mean that the memory is full in the machine. When a disc interface has been installed, less memory is available but it can be reclaimed by setting the PAGE to &EØØ.

Q Can you explain the 512K memory expansion board that Acorn has developed for the BBC Master?

Name and address
supplied

A The 512K expansion you refer to is the Acorn 80186 co-processor board which has 512K of Ram memory.

The Acorn 80186 co-processor allows a BBC eight-bit computer to function as anIBM PC or clone. It costs about £120 secondhand as Acorn no longer makes them.

ACORN CUSTOMER HOTLINE

This month's article comprises information about two software items widely used on the Archimedes and BBC A3000. First, I'll look at the BBC B emulator.

Acorn has developed an enhanced model B emulator for Risc OS. This has been made available at a special discount for use in educational institutions in the UK and for software developers registered with Acorn.

Teachers should approach their local LEA or IT centre for further information.

Subscribers to SID (Acorn's Support Information Database) can download a copy of the software and all the other parts normally supplied on the disc. The software can also be obtained on disc for people who do not have access to SID.

The disc comprises:

- an improved version of *!65Host*, which emulates the BBC model B environment
- utilities such as DFS converters, picture converters to transfer BBC screens to the Acorn Archimedes or BBC A3000 and a program which will scan your BBC Basic programs and check for any possible problem areas which will cause trouble when porting the programs across.

All these utilities are designed to help transfer and modify 6502-based programs for use with Risc OS computers

- examples to illustrate how to port existing 6502-based programs onto Risc OS
- a comprehensive User Guide in electronic format.

To obtain a copy of the software on disc, send your name and address and a cheque or postal order for £19.55, made payable to Acorn Direct, to: 13 Dennington Road, Wellingborough, Northants NN8 2RL.

And now to the second item of software, which is called *ChangeFSI*. This is colour image processing, using a fixed set of 256 colours. Archimedes computers have full colour display capabilities built into them as standard.

However, compared with the hardware found in larger workstations, the facilities provided have been carefully reduced (in order to make them cheap enough to fit all the time). So, the precision of the digital to analog converters is only four bits (instead of eight) and the colour palette only has 16 entries (instead of 256).

This leads to a conversion problem for colour images built on other machines. The solution involves colour Floyd Steinberg error diffusion to a fixed colour palette and has implications for other machines, especially when sequences of images or many images shown on the same display are concerned.

In addition to solving this particular problem, a number of conventional image enhancement algorithms (sharpening, dynamic range expansion, histogram equalisation) and an 'equal area' anti-aliased size scaling routine are all incorporated in the same step, giving a maximal quality output.

Most image formats are supported by *ChangeFSI*, including the following:

TIFF pictures, one-24 bits per pixel; MacPaint files, 576 x 720, one bit per pixel; Gem IMG images; Sun 'pixrect' raster files, one-24 bits per pixel; Compuserve's GIF files, up to eight bits per pixel.

Subscribers to SID (Acorn's Support Information Database) can download a copy of the software and all the other parts normally supplied on the disc. The software can also be obtained on disc for people who do not have access to SID.

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– see separate panel		
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– see separate panel		
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– Newhall		£41
– Starter		£41
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Font Pack	Bee	
– 1 (already included with Ovation): Paladin, Swiss B, SymbolB, Vogue		£43
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– 3: Dingbats, New Century Schoolbook, Optima, Times		£POA
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– see separate panel		
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– see separate panel		
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Render Bender	Cla	£58
Rhapsody	Cla	£35
RiscBASIC Compiler	Sil	£113
RiscForth Compiler	Sil	£113
RISC OS Companion Vol1	Sof	£49
RoboLogo	Sil	£75
Schema	Cla	£96
School Administrator	Min	£69
Score PMS	Emr	£499
ShareHolder	Sil	£139
Sigma Sheet	Min	£53
Snippet	4ma	£26
SolidCAD	Sil	£113
SolidsRender	Sil	£113
SolidTools	Sil	£279
Squirrel (delivery January)	Dig	£109
– Econet version		£459
– site licence		£475
Studio 24 Plus	Emr	£POA
Super-Dump	Sil	£25
Super-Plot	Sil	£32
System Delta Plus II	Min	£54
Tempest	Cla	£97
Timewatch	Mit	£26
Toolkit Plus	Cla	£37
TWO (Task and Window Organiser)	ICS	£19
– site licence		£60
Utility Disc 1	Dat	£13
View	Aco	£47
VewSheet	Aco	£47
ViewSpell	Aco	£34
ViewStore	Aco	£52
Wordpower Arc	ICS	£36
– site licence (extra)		£100
1st Word Plus	Aco	£64

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– Sheet feeder		£54
Bubble Jet BJ-130E	Can	£479
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KX-P1124	Pana	£226
– 32k ram for above		£20
KX-P1624	Pana	£369
KX-P4420 8ppm	Pana	£792
KX-P4450i	Pana	£1275
– 1Mbyte upgrade		£299
Laser Direct	CC	£856
Laser Direct LBP4 Card	CC	£350
Laser Direct LBP8 600 dpi including toner	CC	£1287
LC24-10 32k ram card	Sta	£61
Swift 24 Colour	Cit	£270
Archimedes parallel printer cable		£8

MONITOR

Multivision 795	Tax	£492

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i-Scan	Irl	£587
Scan-Light A4	CC	£379
– Sheet feeder		£POA
Scan-Light Junior	CC	£178
– A3000 version		£175

UPGRADES

A3000 2Mb	Ato	£68
A3000 2Mb	Ife	£68
A3000 4Mb	Ife	£243
A310 2Mb	Ato	£345
A310 4Mb	Ato	£499
8Mb A400/1 / A440 / R140	Ato	£699
ARM3	Ale	£400

FUNCTION KEY STRIP ORGANISER

Arckey	ICS	VO£3
– quantity of 4		VO£10

KEYBOARD COVERS

Seal 'n Type (spill-proof)		
– Archimedes	Kad	£14
– A3000	Kad	£14

ICS FONTS

1st Word Plus **First Fonts**
PipeDream **PipeDrivers**
Wordpower **Power Fonts**

Please tell us which of the above you need and specify your printer make and model. A more detailed list of fonts is available.

Site licence £50
For multiple use of First Fonts or PipeDrivers. (Power Fonts are covered by a Wordpower site licence).

Symbol sets
e.g. Chemistry, Czech, ICS1 (Forms Design), ICS2 (IBM characters), Latin 1 (includes French, German, Italian, Spanish), Latin 2, Latin 3 (includes *Esperanto*), *Latin 4*, Mathematics & Physics, Russian

- for dot matrix £19
- for laser £29

24-pin & HP laser typefaces
Bodmin, Neston, Old English, Personal, Royden, Shadow and Initials, Universal 8pt, Universal 10pt, Universal 12pt, Weimar Fraktur

- 24-pin: any 3 faces £29
- laser: any 3 weights £29

Star LC-10 typefaces
Black, Caldy, Outline, Parsby, Raby, Shadow, Universal

- any 4 £19
- all 7 £29

PipeDriver Dot 1 £10

Powerfont NTQ £13
Provides near letter quality on ordinary 9-pin printers. Required for some Power Fonts.

KEY TO MAKERS

Ace	Ace	Col	Colton	Mit	Mitre
Aco	Acorn	CW	Computerware	Min	Minerva
Ale	Aleph One			Oak	Oak
Arm	Armadillo	Dab	Dabs	Pana	Panasonic
Arn	Arnor	Dat	Data Store	Pand	Pandora
Arx	Arxe	Dig	Digital Services	Ser	Serial Port
Aut	Autodesk	Emr	EMR	Sha	Sharp
Bee	Beebug	Eps	Epson	Sil	Silicon Vision
Cal	Calligraph	ICS	Ian Copestake	Sim	Simtron
Can	Canon	Ife	IFEL	Sof	Software Solutions
CC	Computer Concepts	Irl	Irlam		
		Kad	Kador	Sta	Star
Cir	Circle	Lin	Lingenuity	Tax	Taxan
Cit	Citizen	Lon	Longman	Tec	TechSoft
Cla	Clares		Logotron	4ma	4Mation

In the News

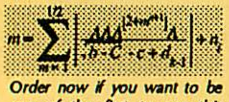


DRAWBENDER

DRAWBENDER will make Draw files follow a shape of your choice. A useful addition or cheap alternative to Poster, available with or without a set of three decorative fonts. The example above was made using DrawBender with FontFX.

We will send a £25 voucher to the purchaser who thinks of the best new name for it!

EQUASOR



Order now if you want to be one of the first to use this equation building application, with its own mathematical, Greek and other symbols.

WORDPOWER

Still the best for the Electron, Master and BBC.

"I have yet to find a word-processor that gets close to it for usability and quality of output" said BEEBUG recently.

SCHEMA

RISC User decided that the Schema spreadsheet "has to be the first, if not the only choice". We expect to have it in stock by the time you read this.

SQUIRREL

You would be nuts not to order this new database from Digital Services at our special offer price of £1091 Delivery will be in January.

BASIC Editor and Toolkit

BBC, Master and Electron users will find BET makes the creation and editing of BASIC programs a real pleasure and encourages the development of a good programming style (Archimedes owners will envy its facilities). Full details on request.

CITIZEN SWIFT 24

For a limited period we are offering the colour version of this printer for only £2701

MISMATCH

A delightful new version of the Pelmanism memory game for all age groups. Excellent graphics and (controllable) sound. An ideal introduction to the Archimedes for five-year-olds. Grown-ups will find it addictive but good for the mind!

PIPEDRIVERS

If your dot matrix printer has more features than PipeDream knows what to do with, you need Pipe-Driver Dot 1. It provides access to resident and download fonts, ink colours, variable print size and line spacing etc.

Like our **First Fonts** for 1st Word Plus and **Power Fonts** for Wordpower, PipeDrivers can make foreign language and scientific word-processing a pleasure. And our 24-pin and LC-10 typefaces will brighten your output at full printer speed.

ARCKEY

With more applications on the market a function key strip organiser is indispensable. Arckey users do it without glue! Suitable for BBC and Master too.

POSTER

Use it on its own or with any DTP program to produce endless special effects at any size. Our price includes a site licence, a range of clip art and borders, and 20 fonts which can also be used with other programs.

TASK AND WINDOW ORGANISER

TWO can group a number of tasks together and start them up with one double-click on the mouse. Applications can be run, files loaded, directories opened, and star commands executed.

Up to 42 task groups may be defined very easily and listed on the screen when the computer starts up. A great help when inexperienced users need access to the system, and a welcome time-saver for old hats.

TWO will instantly re-arrange windows in rotating stacks, piles or a space of their own. No more hunting for the missing one! TWO will also save configuration settings, set Copy and Wipe options, or blank the screen after a specified period of inactivity.

New from Ian Copestake Software £19 + VAT Sites £60

Getting the ideA

At last there is a high-quality range of hard disc upgrades at affordable prices. The *ideA* range from ICS.

For those who haven't heard, the *ideA* is a brand new hard disc interface for Archimedes and A3000 computers. 'IDE' stands for Integrated Drive Electronics. As the name suggests IDE hard discs have sophisticated electronics built into them, allowing the computer interface to be simpler, cheaper and more reliable. Transfer and access speeds can also be enhanced.

Most IDE discs are auto-parking, and some have the ability to switch themselves off to save power during periods of inactivity.

Now for the first time we can offer Archimedes users products previously available only in the PC world.

Although the *ideA* is new, you can use it just like the familiar ADFS. All properly written software will work as usual and there is no conflict of *ideA*s with existing ADFS or SCSI drives.

Fitting a hard disc in an A300/400 series computer is straightforward and clear instructions are provided. All discs supplied by us are tested and formatted. The complete upgrade kit includes a disc cradle and fan, and is called for example **IDEARCIN40**. The 40 at the end indicates the hard disc capacity: our Price List shows the sizes currently available (others will be added soon).

A backplane is not needed on the A310 unless you wish to connect other podules. In that case you must use a high-quality four-layer backplane such as the one we offer.

INTERNAL A3000 HARD DISC

One of the most exciting products in the *ideA* range is a fully internal hard disc upgrade for the BBC A3000. This is ideal for schools or any location where space is at a premium or where security and portability are important. The **IDEA3IN20** uses one of the latest 2½" 20 megabyte low-power discs. We cannot be sure yet whether larger capacities will become available for internal fitting.

Although installing the A3000 upgrade is quite easy, it could be dangerous for inexperienced users to open the computer. We have therefore priced this particular product to include collection and fitting at our service centre. (Please make sure we have your daytime and evening telephone number so we can arrange this). Deduct £10 if you do not require the A3000 fitting service.

Ian Copestake Software will be producing a range of other accessories for the A3000. First to arrive is **IC PLINTH**, a steel monitor stand to which you can later add **IC HOUSE**, our hard and floppy disc drive housing (ready soon). The Plinth can take a variety of 14" monitors yet occupies less than 18" from front to back when in use. It has anti-slip feet and may be fixed to a desk. Assembly is easy. There is full access to the mains switch and floppy disc drive, while the reset switch is accessible but guarded.

The *ideA* hard disc controller is also available on its own for those who are confident of choosing a suitable IDE hard disc themselves. The product reference is **IDEARC**. We must point out that we can only accept responsibility for the performance of the *ideA* interface with discs we have tested.

INTRODUCTORY PRICES
(guaranteed until 31st December)

IC HOUSE			T.B.A.
IC PLINTH			£21
IDEA3IN20	23ms*	incl fitting	£499
IDEARC			£110
IDEARCIN40	28ms*		£349
IDEARCIN80	19ms*		£499
IDEARCIN135	28ms*		£699
IDEARCIN200	15ms*		£899
IFEL 4-slot 4-layer Backplane			£57

*Average access times, subject to constant improvement

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Ian Copestake Software



For all Archimedes and A3000 owners, **DAVE ACTON** has compiled

RISC REVUE

£15 LANDSCAPE ARTISTRY

Computer-generated landscapes are really quite the things these days and our opener this month is a fine example of the trend. It's listing 1 on the yellow pages and comes from **Andrew Jones** and **Shane Hope**.

Enter and run the program. First, you are asked how many iterations are required. Possible values range from 1 to 8, where 8 is the most detailed landscape and one the simplest. Predictably, the larger the number, the longer the program takes to create and plot the landscape.

Next you are asked for a landscape type. Enter 0 or 1 – the colours are chosen appropriately to resemble either a rocky, mountainous terrain or a hilly, tropical rainforest.

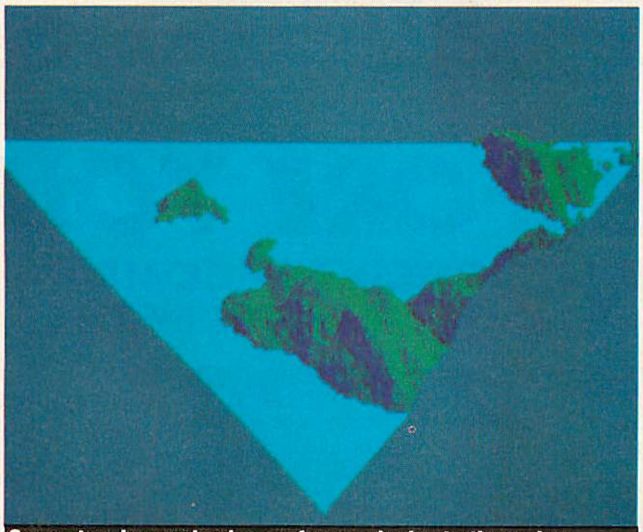
When plotting is finished, you have the option of saving the screen.

The subject of fractals has been covered many times in *BAU*. But for those new to the subject, a fractal is somewhere between a line and a plane. It's particularly useful when drawing 'ragged' things like landscapes because the closer you look at a fractal, the more detail is revealed.

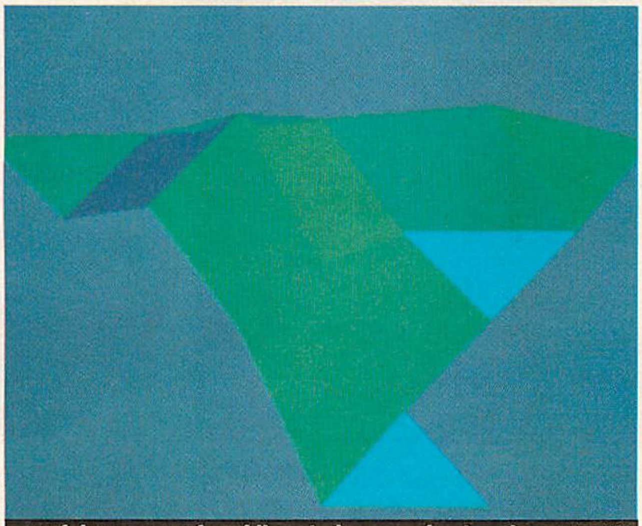
Indeed, you can continue looking closer and closer indefinitely and new details will always appear. The familiar Mandelbrot patterns are good examples from the world of fractals. The number of iterations entered at the start of the program represents how closely you are looking at the fractal.

The landscape is stored as an array called matrix%(). Each element of the array represents the height of the landscape at a particular point. If your machine has more than 1Mb of memory you might like to increase the dimensions of the array to provide more detail.

PROCdoppler does the work of generating the landscape and this procedure is called once for each iteration. The general idea is to divide and subdivide each strip of ground using the Basic RND function to provide the necessary randomness. One advantage of fractals is that the random number generator used can be seeded so that the same 'random' sequence is always produced. In this way you can generate a known landscape from a single starting value – very useful as a way of avoiding storing the co-ordinates of segments of a complex terrain.



Generate a known landscape from a single starting value...



...useful as a way of avoiding storing complex terrain segments

The plotting is done by PROCdraw_fractal which calculates the position of each triangle and its colour (depending on the height and angle).

As a final thought, if you have a Basic compiler such as *ABC* or *RiscBasic*, you might like to try compiling the program for faster results. If you can, switch off checks for ESCAPE, stack overflow and select single-precision arithmetic if possible.

£10 NO EXIT

Next comes a small but perfectly formed application from **Tim Gladding** of Ely. It's a must for all those who have inadvertently exited from the desktop by clicking on star commands on the task menu and missing! It's called *Anti-Exit* and once installed, it simply asks for confirmation before you're allowed to leave the desktop.

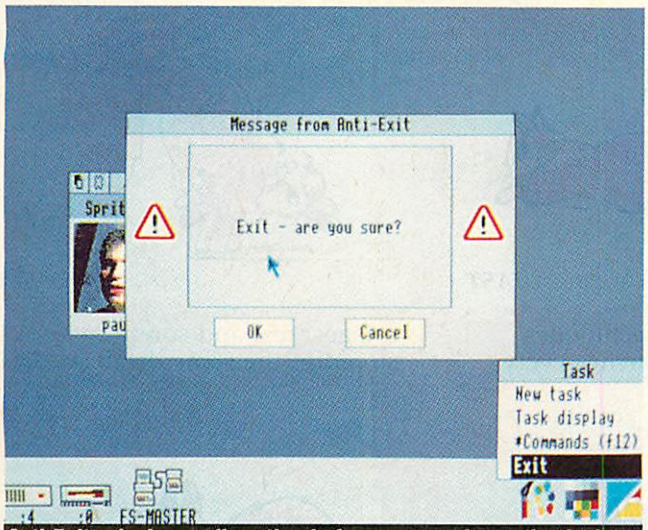
All good applications should provide a warning or the opportunity to save edited files prior to the desktop shutting down. They do so by listening out for a particular message issued by the Wimp.

In fact there are two messages – 0 (quit) and 8 (prequit). Upon receiving the quit message zero, an application can do nothing to stop the Wimp closing down but at the prequit stage it can register its objections.

Tim's program picks up this message and acknowledges it if the user answers no to the 'are you sure?' This tells the Wimp that, if possible, closedown shouldn't go ahead.

To use the program, first create a directory called *Anti-Exit* and, in it, save listing 2 as Run-

his regular bounty of advice, hints, tips and programming snippets



Anti-Exit asks for confirmation before you can leave the desktop

```
!Run file for !Anti-Exit
Set Exit$Dir <Obey$Dir>
WimpSlot -min 16K -max 16K
Run <Exit$Dir>.!RunImage
```

Fig 1. Lines of the run file

Image. Then create another file in the directory called Run. This should be an obey file and the easiest way of creating it is to use *!Edit*. The lines it should contain are given in figure 1. When done, click on *Anti-Exit* to install the facility.

£10 e FOR EULER

As there seem to be a lot of mathematically minded readers of this column, here's a little something from **P S Williams** of St Albans to keep them happy. It calculates that wonderful number e to any required number of decimal places (memory permitting).

You'll find it as listing 3 on the yellow pages.

As constants go, e is one of the most important, cropping up in such diverse areas as population growth, radioactive decay and compound interest. The Euler number, as it is also known, can be calculated from the convergent series:

```
e = 1 + 1/1! + 1/2! + 1/
3! + 1/4! + ...
```

from which you can see that the first two parameters give a value of 2 and the remainder the fractional part. The more terms you consider, the more accurate a value for e you can obtain. Using the so-called Lagrange remainder, it is possible to forecast how many terms need to be considered to accurately provide a given number of decimal places of the constant. If D is the number of places required and N the number of terms that must be considered then:

```
e / (N+1)! < 0.5 * 10
^ (-D)
```

Run listing 3 and enter the number of terms (try 100 to start with). The constant will be calculated and displayed to the appropriate number of decimal places.

For those interested in the history of this calculation, Mr Williams refers you to a piece by Tom Vickers in the June 1985 *Computer Bulletin*. He also points out that the technique was used on the very first computers – Pegasus and Ace.

£5 TOP-BIT TIP

Two readers have written in with tips for making full use of the character set available on the Arc. Normally only characters in the range 32-127 are used, but the Arc is capable of supporting many foreign languages and it does so using the so-called top-bit-set characters from 160 upwards. However, with the limitations of the standard Qwerty keyboard, typing these characters while in the desktop would be tricky were it not for the international keyboard module. This is a part of Risc OS and permits the user to enter any Ascii code from 0 to 255. Additionally, the ALT key may be used in conjunction with the Qwerty keys to produce useful symbols.

Simon Cottrell of Bishop Auckland reminds us that any Ascii code can be typed in by holding down ALT and typing the Ascii number in decimal on the numeric keypad. He suggests using this method to create the 'special effects' files described by Jonathan Baldwin in the August issue of *BAU*. You'll remember that the original tip was to store printed control codes for underline, bold, italic, etc, in files and drag them onto *!Edit* windows when needed.

Another reader to make use of the international keyboard module is **Simon Burrows** of Stoughton. He notes that Ascii code 160 is normally defined as a space and therefore indistinguishable from the standard space character 32. Code 160 is produced by pressing the space bar with ALT depressed and has the advantage that it may be included in filenames.

Note that only 'E' and 'D' format discs allow top-bit-set characters in filenames. Old-fashioned 'L' format discs do not. As well as the pretend space character, other symbols can be produced using ALT – try ALT 2 or ALT C for example.

£5 !TINYDIRS TIP

Two more readers have picked up on a largely undocumented feature of the *!TinyDirs* application. **Barry Hillard** of Leicester points out that if you have included the command *!TinyDirs in your boot file you can follow it with a list of directory names.

When the file is run, all of the directories in the list will appear on the icon bar. Indeed, *!TinyDirs* is not the only application to understand a list in this way – try installing *!Paint* with a command like:

```
*!Paint Spritef1 Spritef2
Spritef3
```

where Spritef1, Spritef2, etc, are the full pathnames of valid sprite files.

Another reader goes beyond this idea and suggests a few modifications to the *!TinyDirs* program. **Richard Walker** of Derby points out that if you have deep directory trees and want to bring up several directories on the icon bar, one command line is not sufficient. Instead, he has come up with a way of supplying *!TinyDirs* with a text file containing a list of directory names.

First, make sure you have a copy of the original *!TinyDirs* stored somewhere safe. Then alter RunImage by adding the following routine between lines 220 and 230, using suitable line numbers. (The easiest way is to use the Basic Editor).

```
J%=INSTR(param$, "-file")
IF J% THEN
param$=MID$(param$,J%+LEN
("-file "))
X%=OPENIN(param$)
REPEAT
dir$=GET$#X%
SYS "OS_File",5,dir$
TO type%
IF type%<>2 THEN CLOSE#X%
:ERROR 1,"'"+dir$+"', is
not a directory."
PROCstash(FNdiricon(FNleaf
(dir$),dir$),dir$)
UNTIL EOF#X%
CLOSE#X%
ELSE
```

and add an Spritef2 after line 320. The command

```
!TinyDirs -file
:4.$.Progs.!Dirlist
```

will read in the filenames from the file :4.$.Progs.!Dirlist and this file can be created in *!Edit*.

DO YOUR BIT...

All programs, ideas, hints and tips are gratefully received. Send them to: Risc Revue, BBC Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Just imagine all those itchy fingers waiting to type in your code.*

SQUIRREL

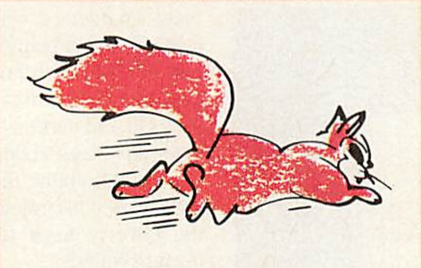
THE REVOLUTIONARY NEW DATABASE FOR ARCHIMEDES COMPUTERS





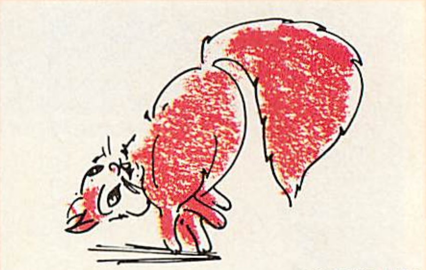
FRIENDLY

Squirrel is the easiest to use database yet, allowing simple point and click database creation and queries.



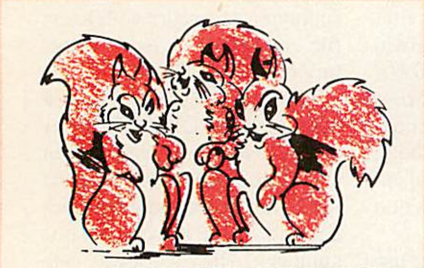
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Modern indexing techniques mean superfast searches every time.



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Client/server design ensures that squirrel runs just as well on networks as standalone.



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Queries may be made onto other popular computers such as an IBM or Macintosh, even remotely over telephone lines.



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Suitable for Acorn A3000, A310 and A400 Series.

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NEXT MONTH IN BBC ACORN USER

ARC DESIGN

How can you achieve state-of-the art design on the Archimedes? We review a selection of CAD packages to help you get more visual power from your machine

DESKTOP OFFICE

The latest business package from Minerva offer five different applications, including a database and wordprocessing. But does it offer the right solutions for business users? Read our review

RHAPSODY

Does the new music notation package from Clare's hit the right note? We put it through its paces

DIGITISERS

If you want to download TV images onto your computer, you need a digitiser. We review some of the best on the market

PLUS

First steps on the A3000

We continue our step-by-step guide to the A3000

Hats off

The exciting conclusion to *BAU*'s *HatTrix* game

Out of exile

Part two of the solution to the *Exile* adventure game

Demos

Read our round-up of what is available in graphics and sound demos

Regulars

- All the latest news from the Arc and Beeb world
- Eight-bit hints and tips
- Risc Revue for A3000/Archimedes users
- Your letters and problems
- Programs galore on the yellow pages

and and much more.

Watch out for the February issue of *BAU* – available January 10 1991.

TO BE SURE OF YOUR COPY, PLEASE FILL IN THE COUPON BELOW AND HAND IT TO YOUR REGULAR NEWSAGENT. OR WHY NOT TAKE OUT A SUBSCRIPTION? SEE PAGE 113 FOR FULL DETAILS.

TO THE NEWSAGENT

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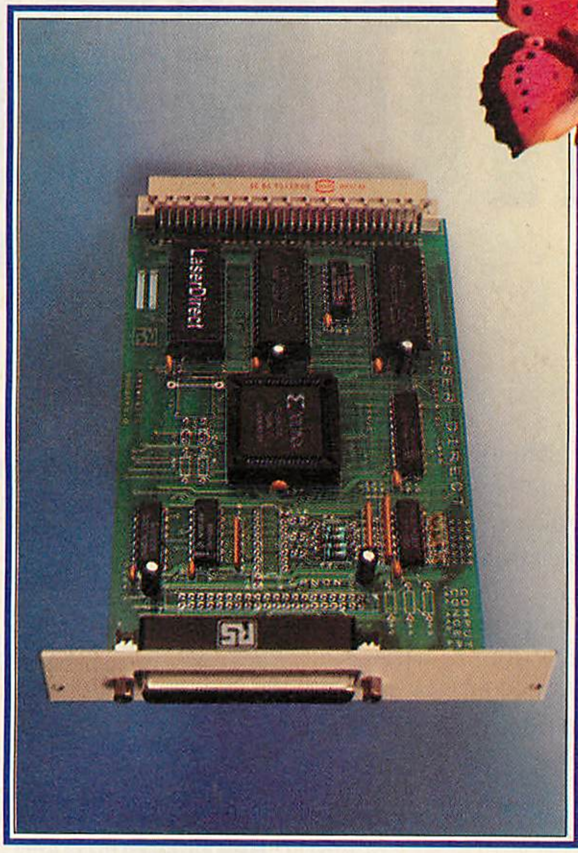
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BBC Acorn User is published by Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Distributed by BBC Frontline, Park House, 117 Park Road, Peterborough.

SOFT HARDWARE





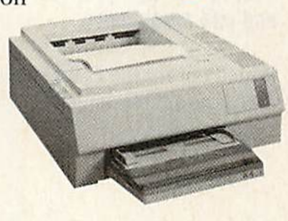
Computer Concepts has always believed in using the most advanced technology available. The Laser-Direct expansion board is an example of this. At its heart is one of the new generation of FPGA (field programmable gate array) chips. This is a re-programmable gate array that performs the hard work of driving the laser engine. It handles all the complex timing, buffering and serialising of the data sent to the laser.

The real beauty of the software design comes from the re-programmable nature of the chip. Using the same board design we re-arrange the circuitry to drive either our 300 dpi liquid crystal printer, or a Cannon 300 dpi laser printer, even though the physical interfaces of the two printers are completely different. We use exactly the same technique to change the circuitry, in the blink of an eye, to drive the Cannon printers at 600 dpi. At this resolution the Laser-Direct board works to a timing accuracy of an unbelievable 50 billionths of a second.

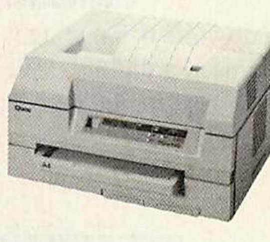
And there's software to match. The printer drivers include a replacement font manager that can print text between two and three times faster than any other Archimedes printer. It compresses pages in memory, queues them, and prints in the background, so that pages can be printed while the computer is used for other things.

LaserDirect

The bottom line is that we can bring the highest performance laser printers to the Archimedes for the lowest possible cost- 300 dpi, 6 pages per minute for £999 + VAT. 600 dpi, 8 page per minute for £1495 + VAT. 'The lowest cost 600 dpi printer in the world'.

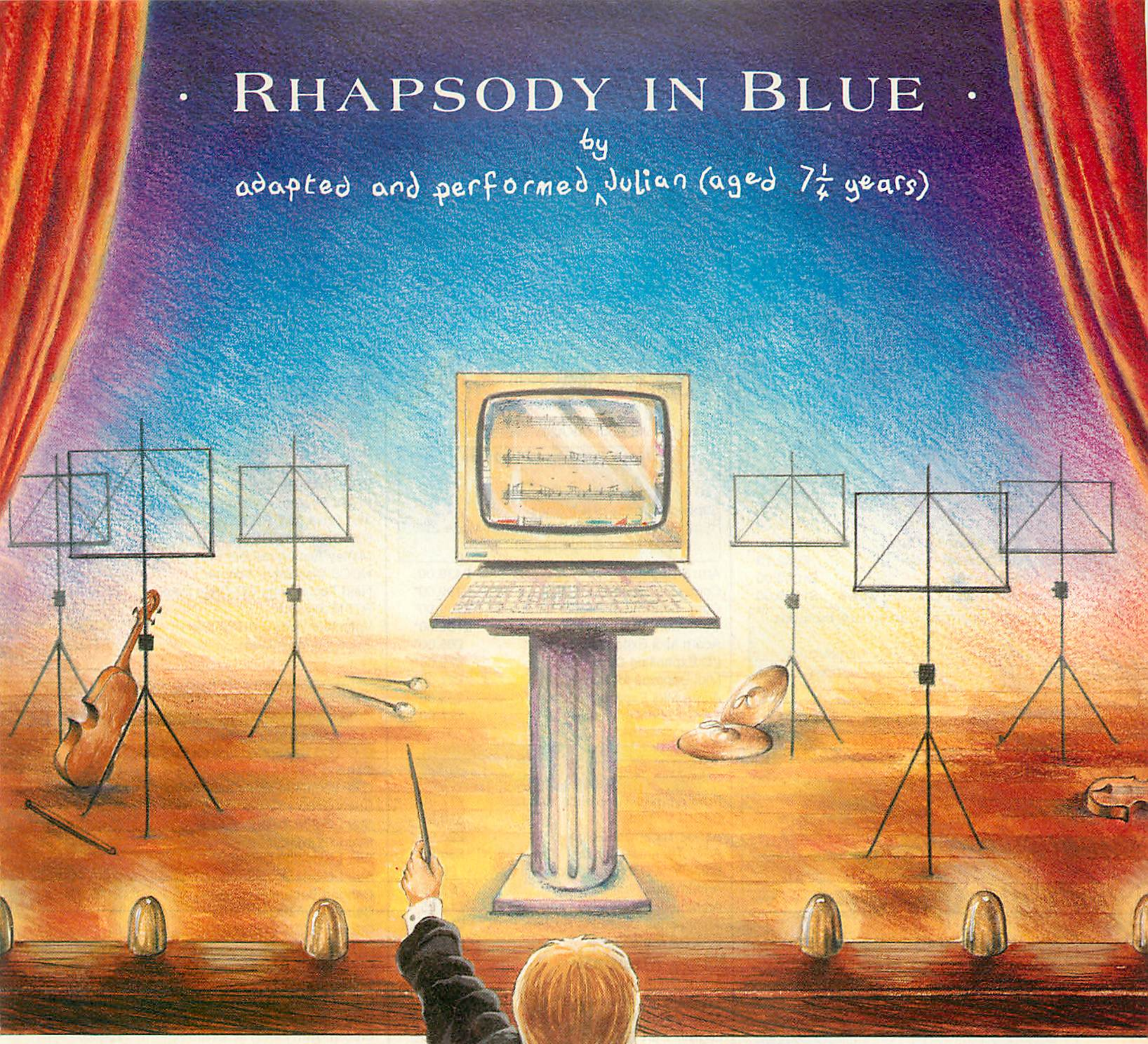


600 dpi 8 page per minute Laser-Direct Hi-Res



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Gershwin, Mozart, Vivaldi, all scribbling away, frantically composing their masterpieces, oh, to have had something a little more practical than pen and ink.

Imagine their delight had they seen Rhapsody. A new music notation package from Clares that allows you to write and modify musical scores in much the same way as a word processor allows you to manipulate text.

You can enter the music manually note by note. Or simply play the music in using a MIDI interface and a MIDI keyboard. Using a standard RISC OS printer Driver, pages, whole scores or individual parts can be printed out. What's more, Rhapsody also accepts Maestro files allowing Maestro scores to be played and printed.

As you would expect, Rhapsody enables you to enter dotted notes, triplets, staccato and accented notes, trills, repeats and much, much more. There is also the ability to add text, so you can easily add lyrics. And five scores can be open at once allowing you to copy data between them.

All of this can be replayed via a MIDI or an Archimedes sound system, it's childsplay, as successfully proved by Julian.

In short, it makes the labour of composing (noting, writing, correcting and changing) quick and easy, allowing you time to concentrate on the important part; the music.

Just think had Schubert had Rhapsody, perhaps his famous unfinished might have been finished. **PRICE – £49.95 (inc VAT).**

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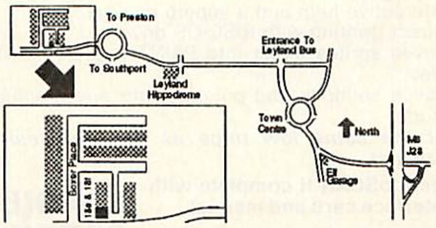
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1Mb RAM upgrade (410/1)	£79(c)
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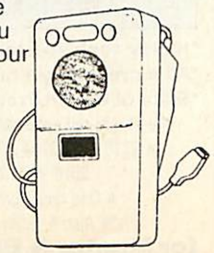
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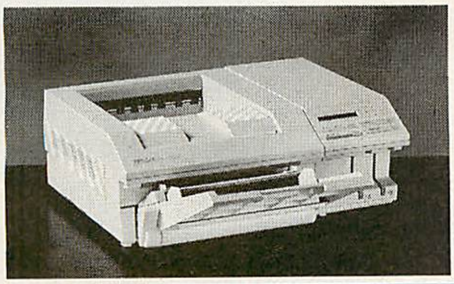
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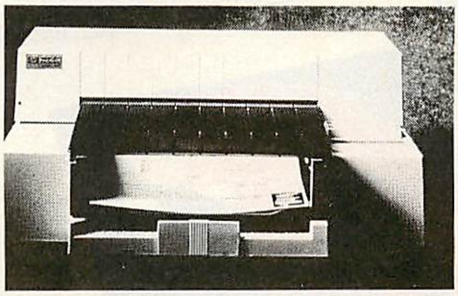
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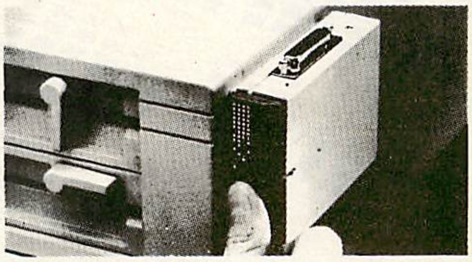
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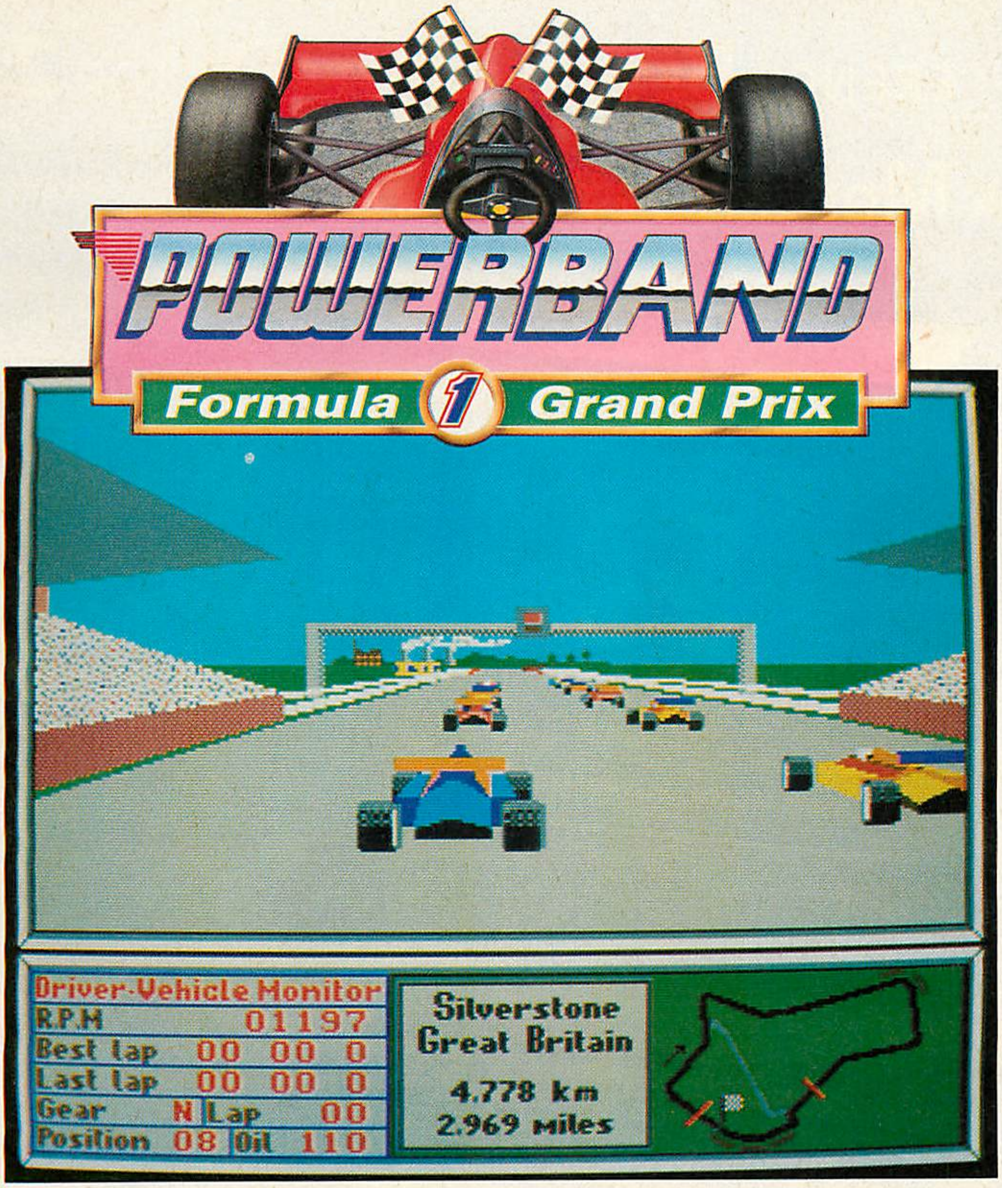
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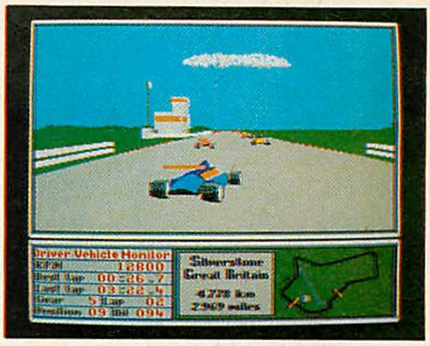
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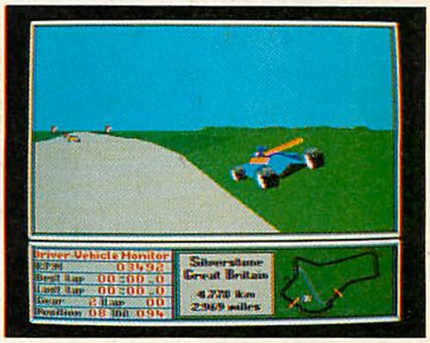
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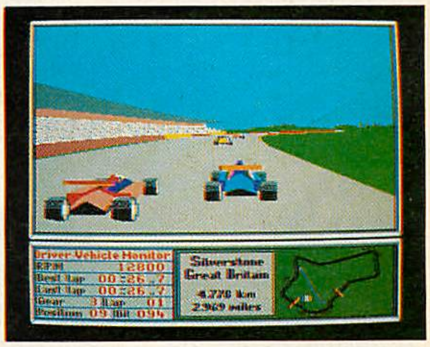
BBC A3000/ARCHIMEDES/BBC A3000/ARCHIMEDES/BBC A3000













Enter the exciting and dangerous world of International Formula 1 World Championship Racing courtesy of your Archimedes and ace programmer Gordon Key. Powerband offers you the chance to drive at up to 260 mph accelerating from 0-60 in well under 4 seconds and 0-100 in less than 8.

This Formula 1 Pseudo-Simulator pits you against a large field of Highly intelligent opponents who all have varying abilities but all really want to win. You are able to set engine power, gearbox types (manual, semi-manual or automatic), aerofoil settings etc. to try and give you the edge.

The unparalleled speed and quality of the animation and sound effects will have you totally absorbed. The engine for your car is digitised from a real 12 cylinder Formula 1 racing car. You can race on 16 real International Circuits (e.g. Silverstone, Hockenheim and Buenos Aires) which have all been meticulously recreated. Many even have additional scenery to improve the aesthetic appeal of what, in the majority of cases, are quite boring stretches of empty tarmac.

Your detailed car can be viewed from any angle and as such it is even possible to turn around and drive back down the circuit (in FUN mode). Plus oversteering at speed can cause you to skid and/or go into a very dramatic spin.

There are 4 playing modes for Powerband, you can select up to 99 laps in any race and all lap records are automatically saved to disc:

FUN mode allows you to choose from any of the 16 circuits and drive an indestructible car which will survive any kind of accident. The ability to reverse in this mode is particularly useful after you've miraculously survived a 260 mph head on crash with a grandstand!

GAME mode gives you the choice of any circuit but your car will explode in a severe crash or through accumulated damage.

TIMED mode can be manually selected with FUN or will be entered automatically before each race in order that your grid position can be determined. It's you against the clock and Pole Position is always your ultimate aim.

WORLD CHAMPIONSHIP mode enters you in The Formula 1 World Championship where you will have to compete in a series of 10 races (these are selected randomly for each Championship from the 16 circuits available) to gain the valuable points needed to become The World Champion. Your car will be subject to damage or failure as in the real thing. At the end of a race your progress in any World Championship can be saved to disc and continued later.

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If you get shot down, with Interdictor 2, you simply start all over again. And, by the way, Interdictor 2 only costs **£34.95 (inc VAT).**

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Nominal Ledger*	£53	Reporter	£29
Ancestry	£59	Mailshot*	£29
System Delta+	£55	MultiStore	£195
System Delta + Reference Manual			£25
Order Processing/Invoicing*			£53
School Administrator			£118

** Requires System Delta*

NEW Business Accounts Packages
Nominal Ledger, Order Processing/Invoicing, Purchase Ledger, Sales Ledger & Stock Control
Price: **£85** per Module or
£325 for complete package

ULTIMUM – Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

The accepted standard for Archimedes computer expansion is the Acorn Podule, designed initially to fit the old 310, and also for the later A400 and A400/1 series micros. The podules fit inside these computers up to four at a time. The A3000 is the little brother of the family, but can only have one podule at a time, plugging into the back of the computer.

Other attempts have been made to expand the A3000 by trying to introduce a 'mini-podule'. This is impractical for many reasons, amongst which is the reluctance of manufacturers to produce them. Nobody wants to re-design podules already produced. Some cannot be produced on a 'mini-podule' as they are far too complicated and simply wouldn't fit.

Watford Electronics listens to the demands and requirements of its customers, and we are glad to say that we have come up with the only real solution to the A3000 expansion problem. The ULTIMUM Podule Racking System allows up to three FULL SIZE standard Archimedes 300/400 series podules to be fitted to the computer. In addition, there is also provision for a hard disc drive and a podule to be fitted internally.

Since the ULTIMUM Podule Racking System takes proper full size podules, you will be able to use any of the currently available peripheral equipment, from companies like Computer Concepts, Armadillo, Acorn and of course, our own brand.

Fitting the podules to 'ULTIMUM' is simple. They are neatly fitted inside the metal case of the rack, avoiding the previously untidy method of hanging the podule off the back of the computer, risking damage to both, it and to the computer.

'ULTIMUM' has its own power supply, so no strain is put on the A3000 power supply. There is also an IEC mains output socket for an Acorn type monitor so reducing the number of plugs required to go to the mains. The ULTIMUM is rigidly clamped over the top and under the computer, and allows direct access to the floppy disc drive and reset button, rather than obstructing access as on other systems. One can also place a standard monochrome or 14" colour monitor (even a multiscan type) safely on top. The mounting method employed is so firm that the computer could even be safely transported without the assembly falling apart.

By popular demand, we are now able to supply refurbished and fully guaranteed, Acorn range of Micros.
(Please telephone for price & availability)

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version **Only £15**

Archimedes 5.25"/3.5" Disc drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. NO SOLDERING is involved. Supplied complete with necessary lead.
Only £21

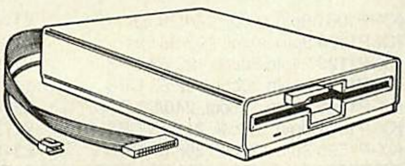
Special Education Prices

All education establishments qualify for special education prices on micros, etc. Please write in or telephone (0923) 37774 or 50335 for written quotation.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399** *(carr £7)*

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

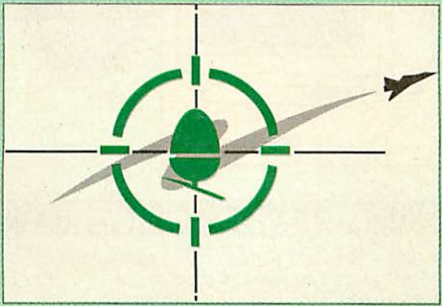
FREE with every BBC Master purchased from us during December

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£115
Econet Module for the Master	£47
Twin ROM Cartridge for Master	£9
Quad ROM Cartridge for Master	£14
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref Manual	(No VAT) £17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	£238
Morley Teletext Adaptor with ATS Rom	£99
Filestore E01S £899	Filestore E40s £749
Filestore E60S £949	Ecolink £270

(Carr. £2 to £7 depending on the weight)

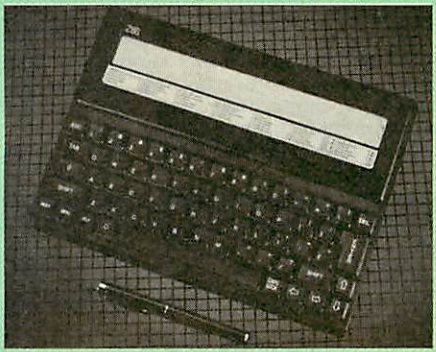
Take the Acorn Archimedes Test Flight and win yourself a Supersonic Concorde Flight



Take the new Archimedes 420/1 Learning system home by booking a slot in Watford's Acorn approved Test Schedule. Call in at our showroom and check it out for yourself – Leave a deposit and you may borrow one of our specially chosen Learning Curve System for up to 14 days. Be satisfied before you buy. Return the system in good order for a complete refund. At the same time you may enter our FREE aviator competition. You could win stunning prizes; Fly in First Class Luxury in Concorde; Learn to fly a helicopter' Take a weekend of flying lessons; and many more prizes. So why not take a test fly at Watford.

For Archimedes Mk II Hand Scanner, Real Time Digitiser, Graphics Tablet, Software & Books, see pages 5, 8, 10 & 12 of our advert.

Z88 Portable Micro



Only: **£195** (Carr £4)

FREE

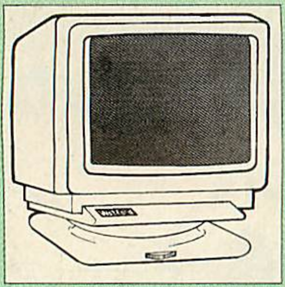
With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

• 32K RAM Pack or 32K EPROM Pack			£18.00
• 128K RAM Pack or 128K EPROM Pack			£45
• 512K RAM Pack			£175
• Z88 Eprom Eraser Unit			£35
• Z88 Spellmaster for Pipedream			£51
• Z88 Carrying Case			£9
• Z88 Computing Book			£9.95
• AA Nicad Rechargeable Battery			£1.50
• Battery Charger Compact & Fast			£6
• Z88 Serial Printer Cable			£9
• Z88 Parallel Printer Cable			£25
• Z88 to Archi Link			£15
• Z88 to BBC Link	£20	• Z BASE	£56
• Z88 to PC Link II	£30	• Z TAPE	£42
• Z88 to Macintosh	£52	• Z TERM	£42
• Z88 Mains Adaptor	£9	• Z88 Modem	£149

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Continued→ → → → → → → → → →



12 months FREE maintenance on site

FREE On-Site Maintenance

This month we are also offering at no extra cost to all our customers, 12 months, On-Site Maintenance on all Microvitec and Multiscan colour monitors; all Panasonic, Hewlett Packard, and all Laser Printers, Roland Plotters and of course the full range of Archimedes micros. Should the machine fail, simply telephone the maintenance engineer, who will call in within 12 working hours. (Offer applicable only when bought at prices advertised in this advert. UK mainland only).

Microvitec Monitors

- **1431** – Standard resolution as used on the BBC television computer programme £172
- **1451** – Medium resolution, suitable for word processing in mode 0 £215
- **Cub3000** Medium Res for A3000 £195
- **1441** – High res, exceeds the capabilities of the BBC Micro £359
- **1451AP** RGB + PAL and AUDIO £255
- **2040 CS** 20" Hi Res £675
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239

Multiscan Colour

- **EIZO** 9060SZ Low Radiation, Super High Resolution, Antistatic screen, multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch £409
- **EIZO** 9070S 16" Low Radiation .28 Dot pitch. As used on Archi 540/1 £625
- **PANASONIC** – 14" Super High Res. 0.29" Dot pitch, non glare screen. Built-in Swivel base **Launch price** £349
- **TAXAN** 770LR Low Radiation Multiscan £425
- **TAXAN** 775 Plus – 0.28 Dot pitch Ultra high resolution, anti-static screen £429
- **TAXAN** 795 TRINITRON 0.26 Dot pitch 1024 x 768 Non interlaced £499

Philips

- **BM7502** 12" Hi-res Green Monitor £70
- **CM8833** 14" Med. Res Colour Monitor £199

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor . A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £179

Dust Cover for Philips Monitors £6

(Securicor carriage on Monitors £7)

Swivel Bases

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the viewing angle.

for 12" Monitors **£8** (carr. £2.50)

for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

Concept Keyboards

Standard A3 Keyboard with BBC Software	£143
Standard A4 Keyboard with BBC Software	£117
Archi A3 Keyboard	£144
Archi A4 Keyboard	£118

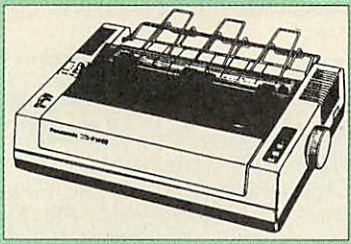
Roland Plotters

(Official Roland Appointed Distributor)

- **DPX 2500** £2389
- **DXY 1100** £545
- **DXY 1200** £715
- **DXY 1300** £899

Panasonic Printers

12 MONTHS FREE MAINTENANCE ON SITE



FREE with every **KX-P1081 & KX-P1180** Printers: A printer lead (please specify type required) and a Dump Out 3 ROM for the BBC Micro or 1,000 sheets of fanfold paper for other micros, please specify)

- **KX-P1081** 9pin 80col. 144/28 cps £124
- **KX-P1180** 9pin 80col. 192/38 cps £134
- **KX-P1123** 24pin 80col. 192/63 CPS £179
- **KX-P1124** 24pin 80col. 192/63 CPS £185
- **KX-P1540** 24pin 136col. 240/80 CPS £390
- **KX-P1592** 9pin 136col. 216/45 CPS £275
- **KX-P1595** 9pin 136col. 288/61 CPS £345
- **KX-P1624** 24pin 132col. 192/63 CPS £318
- **KX-P1695** 9pin 132col. 330/86 CPS £320

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32) £175 KX-P1540 (P35) £175
KX-P1124 (P36) £85 KX-P1180 (P37) £79

Buffers

P12	4K buffer Board for 1081	£55
P42	32K buffer Chip for 1592/1595	£16
P43	32K Buffer Chip for 1540/1124/1180	£16

Serial Interfaces

P17 P1081/1592 £32 **P19** P1124/1180 £55

Integrex Colour Jet

- Colour Jet 132 Printer £515
- Paper Roll £6.50
- Screen Dump Software £10
- Colour Cartridge £19.50
- Colour Textile Cartridge £29
- Black Cartridge £11.25
- Black Textile Cartridge £17
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123

Citizen Printer

120D Plus	£105	124D Printer	£175
Prodot 9	£275	Prodot 24	£275
Swift 9	£198	Swift 24	£238
Prodot Cut Sheet Feeder			£120
Swift 24 Colour Option			£34
Swift 24 Ribbons	Black £4		Colour £13

Canon Printer

Canon Bubblejet BJ 130E	£410
Canon Bubblejet 10E	£269
BJ 10E Cut Sheet Feeder	£58

Hewlett-Packard Printers

- Desk Jet 500 £379
- Quiet Jet Plus £399
- Desk Writer £609
- Scan Jet Plus £725
- Desk Jet Cartridge £15
- HP Think Jet £250
- Paint Jet Colour £676
- Rugged Writer £895

Star Printers

- **LC10-II** 9pin 80col. 180/45 CPS £145
- **LC15** 9pin 136col. 180/45 CPS £250
- **LC24-10** 24pin 80col. 180/60 CPS £175
- **LC24-15** 24pin 136col. 200/67 CPS £315
- **XB24-10** 24pin 80col. 240/80 CPS £379
- **XB24-15** 24pin 80col. 240/80 CPS £489
- **XB-24** Colour Kit £35
- **LC-200** Colour 9pin 80col. 180/45 CPS £185
- **LC-24-200** 24pin 80col. 222/67 CPS £229
- **LC24-200** Colour 24pin 80col. 222/67 CPS £265

Star Accessories

Cut Sheet Feeder

LC10/LC24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139
LC24-200	£63		

Serial Interfaces

SPC-10 LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200 £49

8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £64

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour £29

Buffers

32K Ram Card for LC24-10; 15 & 200	£55
32K Ram Card for XB24-10 & 15	£55

Ribbons

LC10; LC10-II; LC15	Black **£4**;	Colour **£6**
LC-200; LC24-200	Black **£5**;	Colour **£12**
XB24-10; XB24-15	Black **£5**;	Colour **£12**

Laser Printers

Canon LBP-4	4ppm	£735
Canon LBP-8 III	8ppm	£1279
Epson EPL7100	6ppm	£779
HP Laserjet IIP**	4ppm	£725
HP Laserjet III	8ppm	£1199
HP Laserjet IIID	8ppm	£1875
Panasonic KX-P4420	8ppm	£699
Panasonic KX-P4450i	11ppm	£1105
Panasonic KX-4455 Postscript	11ppm	£1799
Qume Crystal Print WP+		£749
Qume Crystal Print Ser. 2		£1065
Qume Crystal Print Publisher 2		£1899
Star LP-8 II		£1099
Star LP-8 Star(post)script		£1299

** Lower Paper Cassette Tray & Premier Collection Software, **FREE** with every HP Laserjet IIP printer purchased from us. Offer subject to availability.

Laser Toners

Canon 2 & 4	£60	Laserjet II & IIP	£60
Epson GQ	£18	Laserjet III	£75
Star LP-8	£59	Qume Crystal	£63
KX-P4420/50	£25		

Laser RAM Upgrades

HP Laserjet II RAM		Laserjet III 1MB	£129
Jetware II 1MB	£175	GQ5000 512k	£99
Jetware II 2MB	£330	KX-P4420 1M	£249
Jetware IIP 1MB	£199	KX-P4450i 1M	£299
Jetware IIP 2MB	£319	KX-P4450i 2M	£575

Laser Drum & Developer

- Epson Drum £129
- Panasonic 4450 Drum £119
- Panasonic Developer £90
- Qume Drum £76

Jetpage Postscript Cartridge

for Laserjet II £369 IID & III £375

Epson Printers

EX800	£410	LQ1050	£540
EX1000	£540	LQ1060	£619
FX850	£295	LQ2550+	£729
FX1050	£370	LX400	£120
FX1060	£599	LX850	£179
LQ400	£179	SQ850	£515
LQ550	£246	SQ2550	£779
LQ850	£439	TLQ4800	£1449
LQ860 Colour	£499		

Cut Sheet Feeders for

EX800/FX800/850/LQ800/850	£130
FX1000/LQ1000/1050	£175
LQ2550	£390
LX400/800/850/LQ400/500/550	£69

Tractor Feed for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/ FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

- EX800/1000 Colour Option **£45**
- EX800/1000 Colour Ribbon **£14**
- LQ2500 Colour Option **£65**
- Multifont Card for LQ550/850/1050 **£95**

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£40	RS232 + 8K Buffer	£79

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 6'	£6
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£6
IBM/Archimedes Parallel Lead 5 metres	£13
IBM/Archimedes Parallel Lead 10 metres	£19
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.
IBM Keyboard extension lead coiled	£5

Important Notice to All our Customers

Watford Electronics only supplies printers fitted with British Specification 240V AC Mains 3 core cable with connections for Live, Neutral and Earth. We do not sell, nor intend to supply grey imports from Europe or Hong Kong with incorrect 220V European mains connections (2 core cable!) which could be dangerous to the end user.

Megabuffer 256



The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatiblity with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in text unit for both the buffer & your printer.

Only £119 (carr £5)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	Serial	Centronics	P&P
2 to 1	£16	£17	£3
3 to 1	£22	£24	£3
5 to 1	£36	£32	£4

(Cables extra at £6 each. Please specify type required when ordering)

2 Way Compact Printer Switch

A handy 2 way compact printer switch. Enables one micro to be connected to 2 printers or vice versa.

Centronics **£18;** Serial **£17**

(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Centronics
2 to 1	£36	£39
4 to 1	£59	£55
8 to 1	–	£85

256K Multi Spooler

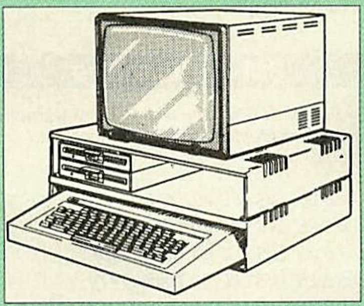
(Auto Printer Sharers – Centronics)

- 2 In/2 out £135 • 4 In/2 out **£169**
- 8 In/1 out £199

Compact Converter Units

Serial to Parallel **£36** Parallel to Serial **£37**

Plinths for the BBC B & Master 128K Micros

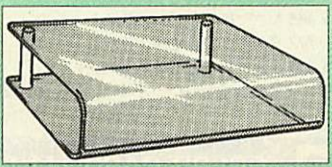


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper **£7**
- 2,000 Sheets 9.5" x 11" Fanfold Paper **£11**
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold **£21**
- 1,000 Sheets 15" x 11" Fanfold Paper **£9**
- 1,000 Sheets true A4 Fanfold Paper 70gms **£11**
- 2,000 Sheets true A4 Fanfold Paper 70gms **£21**
- Teleprinter Roll (Econo paper) **£4**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£6.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

Carriage on 1,000 Labels £1.00

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	£6.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86/800/850	£2.75	£4.50
LX400	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£3.25	£4.75
Panasonic KX-P1124	£7.50	£5.00
SQ2500	£23.00	£5.50
Star LC10/NL10	£2.75	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

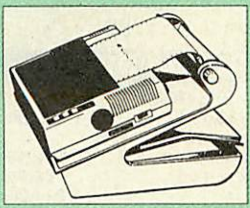
Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110	for KX-P1081, 1592 & 1595	**£8**
P115	for KX-P1180	**£8**
P145	for KX-P1124	**£8**
P140	for KX-P1540	**£10**

Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red **£9.95 each**

Professional Printer Stand

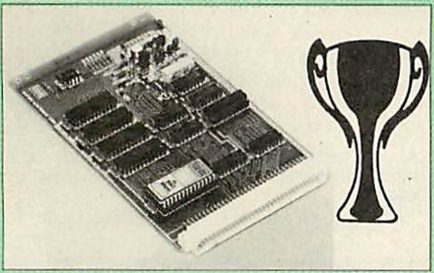


The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergon-omic design ensures smooth paper flow and automatic refolding.

80 Column version £23 (carr. £3)
132 Column version £28 (carr. £4)

Continued→ → → → → → → → → →

Archimedes Real-Time Digitiser



Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £175

A Set of Colour Filters for colour image grabbing using a video camera	£16
New Risc-OS Software Upgrade	£39

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic).

(FREE this month, PC Mouse Drivers & Art package)

(Now, fully LinCAD compatible. Recommended by Linear Graphic).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £225

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£29**

Disc Plonker Rack



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the harzards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

Acorn & Watford DFSs

• Watford sophisticated DFS ROM	£16.00
• Watford DFS Kit complete	£69.00
• We will exchange your existing ROM for Watford's ultimate DFS ROM at only	£12.00
• DFS Manual (comprehensive)	£6.95
• Acorn DNFS ROM	£17.00
• Acorn ADFS ROM only	£25.00
• Acorn 1772 DFS ROM Kit	£49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

• SPECIAL PRICE	£44.00
• DDFS Manual (No VAT)	£6.95
• We will exchange your existing DFS Kit for our sophisticated DDFS for only	£30.00

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

• *10 x 5.25" S/S D/D 40T (744)*	*£5*
• *10 x 5.25" D/S D/D 40T (745)*	*£5*
• *10 x 5.25" S/S D/D 80 Track (746)*	*£7*
• *10 x 5.25" D/S D/D 80 Track (747)*	*£7*
• *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT*	*£11*
• *10 x 3.25" S/S D/D 40/80 Track*	*£7*
• *10 x 3.25" D/S D/D 40/80 Track*	*£8*
• *10 x 3.5" Double Sided High Density*	*£15*

Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

• *10 x **M3** 3.5" D/S D/D 80 Track*	*£7*
• *10 x **M9** 3.5" D/S High Density*	*£14*
• *10 x **M4** 5.25" S/S D/D 40 Track*	*£5*
• *10 x **M5** 5.25" D/S D/D 40 Track*	*£5*
• *10 x **M7** 5.25" D/S D/D 80 Track*	*£7*
• *10 x **M8** 5.25" D/S H/D Hi-Density*	*£11*
• ***M2** 3" Double Sided*	*£2.50 each*

VISA ACCESS

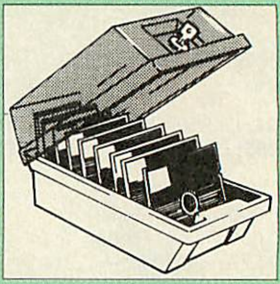
CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units

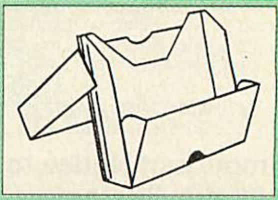


Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

• **M35** – holds up to 50 5.25" discs	£4.95
• **M85** – holds up to 95 5.25" discs	£6.95
• **M25*** – holds up to 25 3.5" discs	£4.95
• **M50** – holds 50 3.5" discs	£6.50
• **M10** – holds 8 of No. 10 Data Cartridges	£15

* Not lockable

Plastic Library Cases



Holds up to 10 5.25" Discs. **Only £2.00**

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

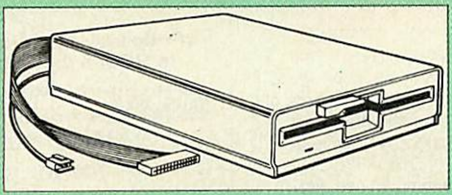
BULK PACK DISCS in lots of 100

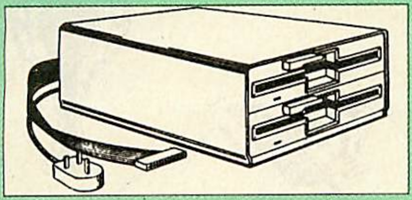
Type	S-S 40T	D-S 40T	D-S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D	£29 for 50		£52 for 100

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below. The tinting of the boxes indicates 40/80 track switchable disc drives. For ease of use, the switches are mounted on the front panel.
All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. *Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high qulity NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. ***Ideal for Schools & Colleges.***
When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 4th page of our advert for the Plinths).
P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415





"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS 400S £74		CS 400S £83	
800K (1,44M		CLD 800S £149		CD 800S £162

• TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £6 to £7

Prefix *C = Cased Drive*
L = Less PSU
S = Single
D = Double

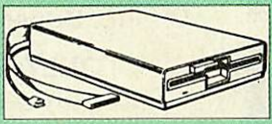
Suffix *S = 40-80 Switchable*

e.g. *CLS400S = Cased Disc Drive, Less power supply unit, single 5.25" 400K, (720K in double density); Double sided; 40/80 track switchable.*

Refurbished Disc Drives now available
CLS400 £50; CLD800 £98; CS400 £59; CD800

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)



3.5" DISC DRIVE OFFER

These top quality 3.5" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Drives to connect to BBC Micros own PSU

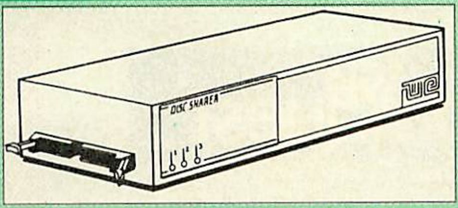
- **CLS35 400K Unit £65**
- **CLD35 Twin 800K £119**

Drives with built-in Power Supply Unit

- **CS35 Single 400K £85**
- **CD35 Twin 800K £129**

(P.S. CS35 Single is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage).

DISC DRIVE SHARER

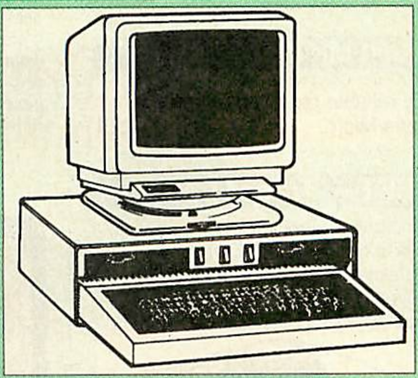


(Ideal for educational establishments)

At last, a low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables Offer Price : **£55**

CDPM 800S DP35-800S



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC B & Master £165

A Double disc drive with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master series is the 5.25" disk, the standard of the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.
To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S. It contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.
The 5.25" disc drive is 40/80 track switchable. DP35-800S has its own power supply, independent of the BBC Micro.

DP35-800S for BBC/Master £154
(Securicor Carr. £7)
(The above drive units are 2 Megabytes unformatted)

Continued→ → → → → → → → → →

QUEST MOUSE Mk II

- Quest Mouse II & Quest Paint £58
- Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse II only £29
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

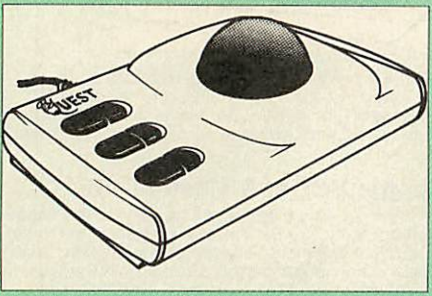
ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £39

QUEST – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version **£32**
QT-20 Archimedes Version **£35**

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible) £45
RB2 including Quest Paint £75
RB2-A for Archimedes £46

THE NEW Mk III AMX MOUSE

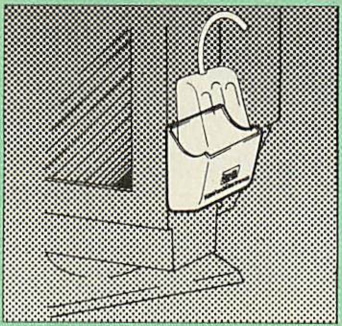
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

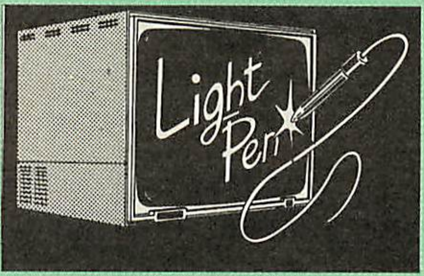
MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.

Price £4



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

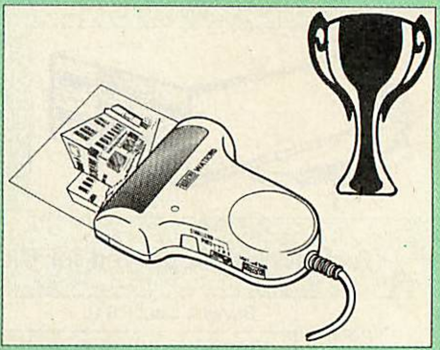
£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.
The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.
All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware **£135**



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using *proportionally* spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£69**
Wapping Editor plus Mouse	**£89**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

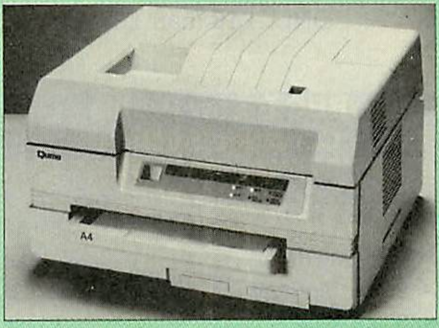
£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Laser Direct



By using the power of the Archimedes RISC processor, it offers the best of both worlds – print speed up to 5 times faster than typical Laserjet compatibles – uses outline fonts so that any font can be scaled to any size – works with all programs that use RISC OS printer drivers. Ideal for use with Genesis, !Draw, Acorn DTP, Impression, etc. Includes 50 sheet paper tray and a single sheet/envelope tray. Requires one expansion slot and at least a 2Mbyte Archimedes. A very compact printer, a very low initial cost and very low running costs.

Launch Offer: £849

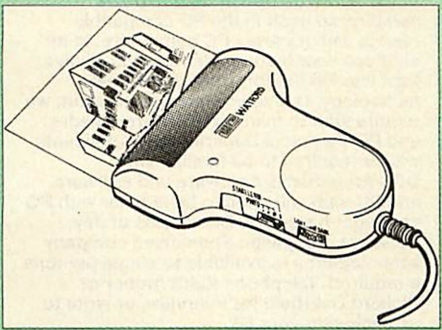
High Res Laser Direct Card for Canon LPB4 **£325**

(For demonstration, call in at our retail shop)

Watford Electronics are:

- Acorn Qualified Dealer & Econet Referral Centre
- ARIES PC Dealer/Distributor
- Cambridge Computer Dealer
- Epson Silver Centre
- EIZO Monitor Dealer
- Microvitec Appointed Dealer
- NEC Appointed Dealer
- Panasonic Premier Dealer
- Roland Plotter Official Dealer
- Star Printer Sub Distributor
- Taxan Appointed Monitor Dealer
- 3M Media Premier Distributor

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.

X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

Price £149

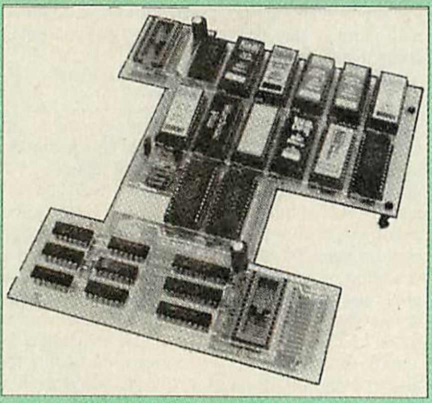
CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Continued→ → → → → → → → →

STAFF VACANCIES

Watford Electronics is the leading supplier in the Acorn computer field and has established itself in the PC compatible market with its Aries PC computers. In its eighteen year history, Watford has always kept itself at the forefront of the new technology. Due to our latest expansion, we require staff to man our BBC/Archimedes and PC Technical Departments. Applicants will be required to be familiar with BBC/Archimedes hardware and software, and PC staff will need to be familiar with PC computer hardware. Good rates of pay, excellent prospects. Subsidised company accomodation is available to single persons if required. Telephone Keith Archer or Richard Overfield for interview, or write to us enclosing your CV.

Solderless Sideways ROM Socket Board



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

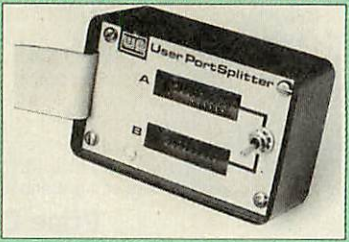
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8.50**
(carriage £3)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

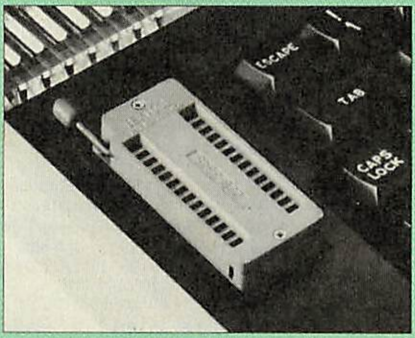
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22** (carr £2)

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18** (carr £3)

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

• Complete System	**£11**
• Spare Cartridges	**£2.75**
• Spare Rack	**£1.65**

ROM Cartridges for the BBC Master

Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£9**; Quad **£14**

16K Disc Ram Module

(16K Sideways RAM Module)

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances)
- Compact construction
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional Battery back-up fitted **£3**

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer *gets up to 28k* of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as th printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £3)

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	**£36**
	Aries B-12C	**£5**

Aries B-488 IEEE-488 Interface Unit

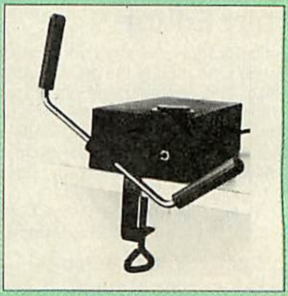
The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

Voltmace Joysticks

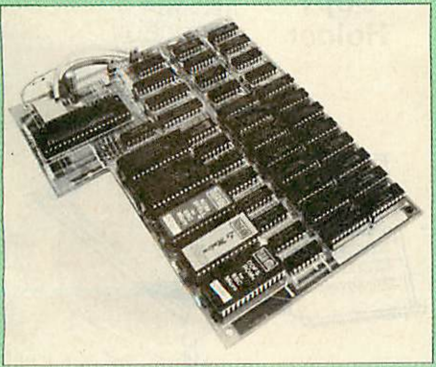
Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**
Delta-Cat A mouse eliminator Joystick for the Archimedes	**£24**

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 **£25**

ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 7 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

- ROM/RAM card with 32k dynamic RAM **£48**
- ROM/RAM card with 64k dynamic RAM **£65**
- ROM/RAM card with a massive 128k dynamic RAM **£109**

(carriage on ROM-RAM Card £3)

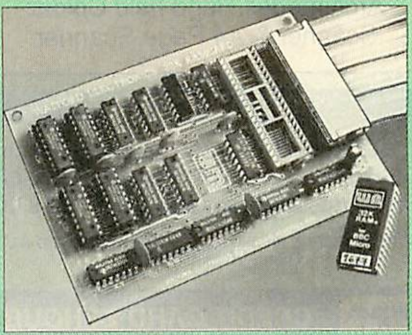
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £9
- 16k Dynamic RAM for Upgrade £13
- Battery backup £3
- Read and Write protect switches £2 each

Complete ROM-RAM board
All options installed £115

P.S.
IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the FULL 32k or the bottom 12k of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £3)
(Price includes a comprehensive manual and the ROM)

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £11.25
- Maths with a Story 2 (Disc). 4 further maths programs. £11.25
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- ECOLOGY O-Level program. £20.00
- POLYMERS O-Level program. £20.00
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. £20.00
- DEUTSCH DIREKT! (Disc & Audio Cassette) £19.95
- ADVANCED TELETEXT SYSTEM £8.65
- PERIOD TABLE SOFTWARE £20.00
- Astronomy – Primary (Disc) £12.00
- Computers at Work – Primary £17.35
- Introducing Geography 11-17 years £17.50
- Electric Fields 6-14 years £11.25
- Black Queen Contract Bridge £13.00
- Espana Viva – 3 Discs £19.95
- WHITE KNIGHT Chess game £16.00
- Inside Science £22.00
- A Vous La France £29.00

More Educational Software

- **FUN SCHOOL 2 – Red:** Under 6 yrs – 8 programs on Discs, Shape Snap, Find the Mole, Teddy Count, Write a Letter, Colour Train, Pick a Letter, Spell a Word & Teddy Bears Picnic. £12.00
- **FUN SCHOOL 2 – Green:** 6-8 yrs – Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump £12.25
- **FUN SCHOOL 2 – Blue:** Over 8 yrs – Eight programs on Disc, Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape. £12.50
- **FUN SCHOOL 3 – Red** £19.95
- **FUN SCHOOL 3 – Green** £19.95
- **FUN SCHOOL 3 – Blue** £19.95
- Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ £26
- More French Games – Another 6 games 12 years+ £26
- Au Restaurant and Accident de Route 12 years+ £26
- Boulogne and Oh-Les – 2 programs for beginners £26
- Letters to French Penpals – 11 years+ £26
- French Programs with Henri Beret – The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 £22
- Six German Games – Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ £22
- More German Games – Aimed at pupils in their 2nd year of learning German. 12 years+ £22
- The Cloze Program – Using context clues to predict is much more than a gap filling exercise. All ages £26
- An Introduction to Electronics – Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years £26
- Computer Control – This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years £26
- The Nuclear Reactor – An interactive, menu driven program for GCSE pupils. Demonstrates & explains nuclear fission & the chain reaction. 14-16 years £22
- PUNCMAN Learning punctuation
  - Puncman 1 & 2 for 7 – 13 years £15
  - Puncman 3 & 4 for 8 – 14 years £15
  - Puncman 5 & 6 for 8 – 15 years £15
- Yes Chancellor – A chance to take over number 11 at Downing Street. 12 years+ £18
- Letters & Pictures – Introduces phonic skills to Infants 6-8 years £15
- Numbers & Pictures – Early number learning is a great fun (4-6 years) £15
- Note Invaders – Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) £15
- Maps & landscapes No. 1 (9-14 years) £18
- Help Your Child learn Basic Map work No. 2 (9-14 years) £18
- Pirate – Educational Adventure (8-14 years) £15
- Spelling Week by Week (6-14 years) £18

Archimedes Software

- BUMPER DISC £14
- Bumper Disc 2 £14
- Bookbinder £43
- Craftshop 2 £29
- DigiSim £35
- Jigsaw £28
- Craftshop 1 £28
- Desktop Stories £27
- Droom £17
- Numerator £60
- Gate Array Teaching System £68
- Fun School 2A Red (up to 6 years) £14
- Fun School 2A Green (6-8 years) £14
- Fun School 2A Blue £14

Continued→ → → → → → → → →

Computer Concept's ROMS

Communicator	£49
Disc Doctor	£28
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42
TERMI	£25
Wordwise	£24

Wordwise plus

£40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	**£45**
View Professional	**£50**
Viewsheet (Acornsoft)	**£36**
Viewstore	**£36**
Viewspell with 80 track disc	**£25**
Viewplot Disc (Please specify for Master 128 or Compact)	**£20**
View-Index	**£12**
Overview packs 1 & 2	**£65**
Hi-View	**£38**

Watford's own Sophisticated View Printer Drivers

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8

All prices are exclusive of VAT

Coming soon . . .

Archimedes Hand held Colour Scanner & A4 Page Scanner

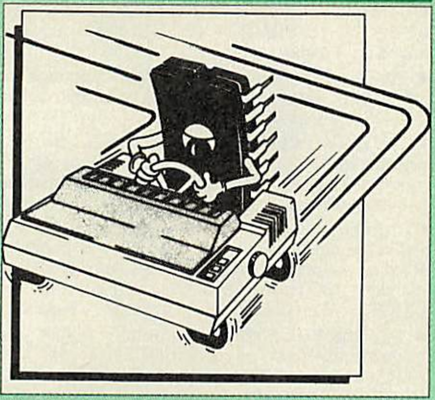
MINI OFFICE II

DISC Version for BBC B & B+	**£14.00**
DISC Version for BBC Master	**£16.00**
DISC Version for the Compact	**£18.00**

(When ordering please specify for which Micro & 40 or 80 track Disc)

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing at only a small outlay.

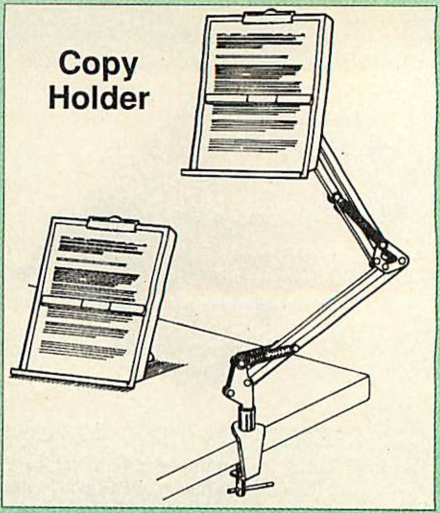
The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £33



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)
Angle poise **£12** (carr. £3)

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£6.95
15 Hr Wordprocessing BBC/WW & WW+	£6.95
30 Hour BASIC (BBC Micro)	£12.95
1st Word Plus Rel. 2 Manual	£10.00
A3000 Technical Manual	£29.00
Acorn DTP A Guide to	£17.00
Advanced User Guide for BBC	**£10.95**
Archimedes 1st Step – Beginners Guide	£9.95
Archimedes Assembly Language	£14.95
Archimedes BBC Basic Guide	£20
Archimedes DTP Manual	£10.00
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference Manual	£79.00
Arm Assembly Lang. Prog. Manual	£15
Assembly Language Prog. for the BBC	£11.95
Assembly Language Quick Ref.	£21.95
BASIC 2 – User Guide	£2
Basic V – A Dabhand Guide	£9.95
BBC Basic Guide (Archimedes)	£19.95
BBC Computer Handbook – The Complete	**£14.95**
BBC Micro – Within the	£11.95
BCPL User Guide	£9
C Big Red Book of	£8.95
C – A Dabhand Guide to	£14.95
C Programming Lang. 2nd Edition	£24.95
COMAL – Introduction to	£9.50
Deutsch Direkt! (Book only)	£5.95
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
FORTH on the BBC Micro	£9.95
Hackers Handbook – New	£9.95
ISO-PASCAL Reference Manual	£9.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Interpreters & Compilers	£14.95
Master 512 Guide – Dabs Press	£9.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14
Master Reference Manual Part 2	£14
Master Reference Manual – Advanced	£17
Mathematical Programs in BBC BASIC	£9.95
MINI OFFICE II – A Dabhand Guide	£9.95
Mouse User Guide to BBC Micro – the Complete	£5.95
Example Programs on Disc for above	£4.95
PASCAL on the BBC Micro	£9.50
PASCAL Programming	£10.95
Practical Disc File Techniques	£5.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
Understanding Interword – A Beginners Guide	£6.50
View 3.0 User Guide	£10
View Guide (View 2.1)	£5.00
View, Viewsheet & Viewstore – Mastering	£12.95
Viewsheet & Viewstore Dabhand Guide	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Z88 – A Dabhand Guide	£14.95
Z88 Computing	£9.95
Z88 Magic	£14.95
Z88 Using Your	£9.95

BOOKS for IBM PC & Compatibles

1-2-3 Mastering Release 3	£22.95
1-2-3 Mastering – 2nd Ed.	£20.95
1-2-3 Special Edition (QUE) – Using	£22.95
1-2-3 Using – Rel. 3	£22.95
8086/8088 Assembly Language Prog.	£13.50
8086/8088 Programming the	£17.95
Ability – Using	£12.95
Accountancy software in Business – Using	£14.95
Agenda – Using	£21.95
Aldus PageMaker – Using	£21.45
Amstrad PC Programmers Ref Guide	£7.50
Amstrad PC1512-1640 Step by Step – Using	£10.95
Autocad – Mastering Through Rel. 10	£28.95
Autocad – Using Release 10	£27.95
Corel Draw made easy	£24.95
C Programming Library – The	£24.95
dBASE III Plus – Mastering	£19.95
dBase III Plus – Complete Reference	£19.95
dBase III Plus Handbook 2nd Edition	£22.95
dBase III Plus – tips, tricks and traps (QUE)	£20.45
dBase III Plus – Quick Prog. Guide	£8.95
dBase Instant Reference (III & III+)	£10.95
dBase IV – Handbook	£21.95
dBase IV – Understanding	£22.95
dBase IV – Using	£20.95
DBASE IV – Complete Ref	£27.95
Desk Top Publishing by Design	£18.95
DOS & BIOS Function – Quick Ref Guide	£7.95
DOS Instant Reference (up to 3.3)	£6.95
DOS, Mastering for Versions up to 3.3	£22.95
DOS Power Tools (includes a disk)	£45.95
DOS – Programmers Ref. Manual 2nd Ed	£25.95
Excel IBM Version – Using the	£22.95
FAX – Managing with	£12.95
Framework III – Mastering	£22.95
Generic CAD – Using	£22.95
Hard Disc Instant Reference	£10.95
Hard Disc – Managing your 2nd Ed.	£20.95
Hard Disc management – Quick Reference Guide to	£4.95
Hard Disc – Management	£18.95
Hard Disc – Using Your	£27.45
Local Area Networks 2nd Generation	£20.95
Lotus 1-2-3 – Illustrated	£18.45
Microsoft 'C' Systems Prog. In	£23.95
Microsoft GW BASIC	£12.95
Microsoft Windows 3 – Using 2nd Ed	£20.95
Microsoft Word 5 _ Using	£20.45
MS-DOS – ABC's of 2nd Ed.	£17.95
MS-DOS Advanced Programming 2nd Ed.	£22.95
MS-DOS Bible 3rd Edition	£19.95
MS-DOS Handbook 3rd Edition	£18.95
MS-DOS Quick Prog Ref Guide	£8.95
MS-DOS Quick Ref Guide	£7.95
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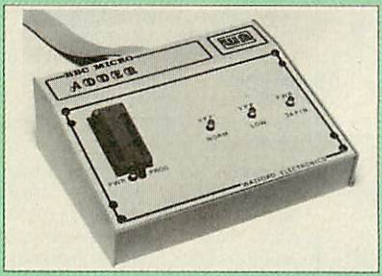
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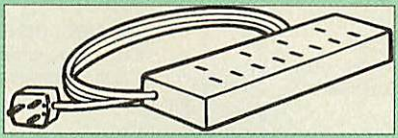
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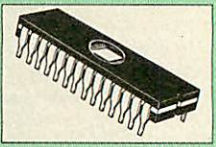
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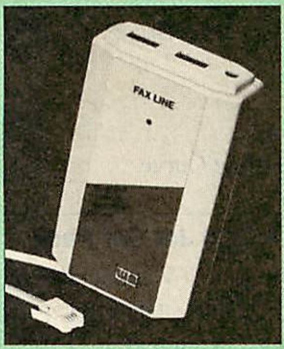
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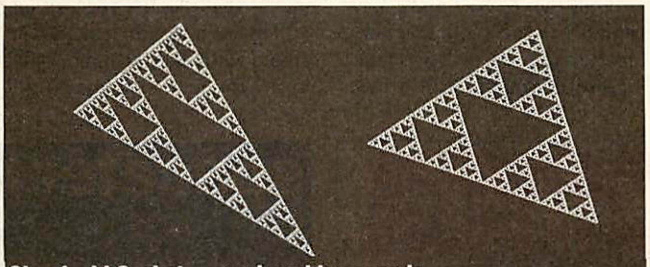
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EIGHT BITS



Sierpinski Gaskets – produced in seconds

Andrew Pepperell from Louth, a regular and consistent contributor to this column, has sent in a whole host of interesting programs, some of which are included in your monthly fix from the Archimedes-free zone. With this bumper instalment of his work, Andrew who, amazingly, is only 15 years old, has overtaken Joe Abley and Phil Bender as the most prolific Eight Bits/Hints and Tips contributor.

Before we start with the new items, Andrew has a few amendments to his *QSave* program from Eight Bits November 1990. Firstly he wrongly assumed that &19 held the low byte of PAGE – of course the low byte is always zero, so you don't need to store it anywhere. Therefore overwrite lines 350 and 940 in the original listing with LDA#0 instructions. Secondly, the program was written with DFS in mind, and only copes with nine-letter filenames. You can make it work with ADFS filenames (up to 10 letters) by altering line 830 to read CPY #11. Full directory pathnames should not be used, as these may exceed the allotted length. Of course, you can extend this by changing line 830 to CPY #maxlength+1 and line 1440 to EQUS STRING$(maxlength,"").

All of Andrew's programs, except the first, are machine code utilities which reside at the usual place of &900 in memory. I've gone over the method of loading, assembling and, where necessary, relocating such utilities in the past, so I'll give that a rest on this occasion.

£15 SIERPINSKI GASKET

This is a package of three utilities, the machine code source (GASKSRC), the resultant machine code (GCODE), and the Basic front end (*BasGask*). This front end is for convenience only, and is not essential. The purpose is to generate patterns forming the Sierpinski Gasket, as explained in *BAU* October 1990. The main advantage of this version is that it is many times faster, producing a recognisable, though incomplete, design in very few seconds. The speed increase is largely due to the program being in machine code, using a more efficient algorithm, and using direct screen writing techniques.

To quickly see the program work, just CHAIN "BasGask". The arrow keys move the vertices around (SHIFT- and CTRL- arrow keys move in larger steps), SPACE changes the vertice being altered, and RETURN plots the gasket. The program is explained in more detail below.

GCODE actually plots the gasket, and should be *RUN. No arguments are required. The program is best called from Basic, as (for this reason) it obtains the co-ordinates for the vertices of the triangle from memory starting at &404. In Basic, this space is occupied by the resident integer variables, and the first six of these (excluding @%) should hold the co-ordinates. A% and B% refer to the x and y co-ordinates of the first corner, with C% and D%, and E% and F%, being used in a similar manner. Note that due to the direct screen writing techniques employed, the graphics grid to which these refer is a little strange. The x co-ordinates should be in the range 0-639, with 0 being on the left-hand edge of the screen. The y co-ordinates should be in the range 0-255, but with 0 at the top of the screen, in an opposite manner to the system normally used. *BasGask* takes the hard work out of this, and is explained in depth below.

Plotting commences as soon as you've loaded the program, after the selection of mode 0. The production of the design is carried out continuously until a key is pressed, in which case the program exits. The improved algorithm mentioned earlier involves simply finding the mean of the two x and y co-ordinates – simple enough maths to be done in machine code, and easier than fiddling about with squares and square roots. A pseudo-random number generator is built-in, as this is required to select which vertice to plot halfway to the next point. Because of the overall need for speed, the method of detecting key presses is rather strange. A vector is set up which is only called when a key is pressed. This avoids slowing the computer down when a key is pressed, and results in a flag being set. After each dot has been plotted, the flag is tested (quicker than testing if a key is being pressed), and if it is set the program exits.

The pixel plotting routines are complex, as plotting a single dot using direct screen writing is rather tricky because each screen byte refers to more than one pixel, but this process is quicker than using the machine code equivalent of PLOT69.

The fact that not a single operating system subroutine is executed in the main loop of the program is another factor influencing its speed.

As mentioned earlier, *BasGask* is a Basic program which aids the production of these patterns, and provides several features. Upon loading, a triangle is displayed, which can be altered. The cursor keys with CTRL and SHIFT move the current vertex (marked with a square cursor), and SPACE selects a different corner to edit. When the triangle is as desired, pressing RETURN starts the plotting (by calling the machine code). To exit from this, press any key. A menu now appears at the top of the screen, offering four options. The Save screen option requests a filename and will save the current screen to disc under that name. A beep will occur in the case of an error (including ESCAPE), and you will be returned to the menu. Print screen requests the name of a machine code program in Rom or on disc which will dump a full mode 0 screen, and will execute that command. Option 3, Plot gasket will return you to

the initial editing stage, where the above process repeats itself. The fourth option, Load code, is provided if you have used a screen dump command which referred to a file on disc which ran at the address &900 or &A00. In this case it will have overwritten the machine code required for producing the patterns, and so this option *LOADs GCODE again.

£10 FILE ALTERER

Altfile is a quick and simple program which allows you to alter the contents of a disc file. To examine a file, type *ALTFILE <filename> (<start address>). The third parameter is optional, and allows you to examine a file from a particular point. This parameter is given in hex, and is the offset from the start of the file (ie, the parameters are identical to the *DUMP command). The program is quite long, and requires four pages of Ram (and eight zero page locations). By default it resides at &900, which is fine on Masters (and alright on other computers if user defined characters and function key definitions are not required), although this can easily be changed in the usual way, by altering the assembly address. Another area, though only suitable on Masters, is the utility workspace at &DD00.

If all goes well, the first 160 (this is constant) bytes are displayed, in 20 rows, in an identical format to *DUMP. This unfortunately makes the utility unsuitable for 20-column screen modes. To scroll through the file, use the up and down cursor keys. To move the cursor around, the Z, X, / and : keys should be used (with any combination of CAPS lock and SHIFT lock). To actually edit a byte, press C and a '?' prompt should appear. At this prompt you can then type a character, and its Ascii value will be 'poked' into the file, overwriting the existing contents. If you have second thoughts, pressing COPY at the prompt will restore the old contents. Note that by pressing CTRL: and any key will give values less than 32, eg, CTRL-A would give the value 1. Further editing is possible with the left and right cursor keys, which decrease and increase the contents of a byte respectively. To exit from an editing session, simply press ESCAPE, or ESCAPE when choosing a byte.

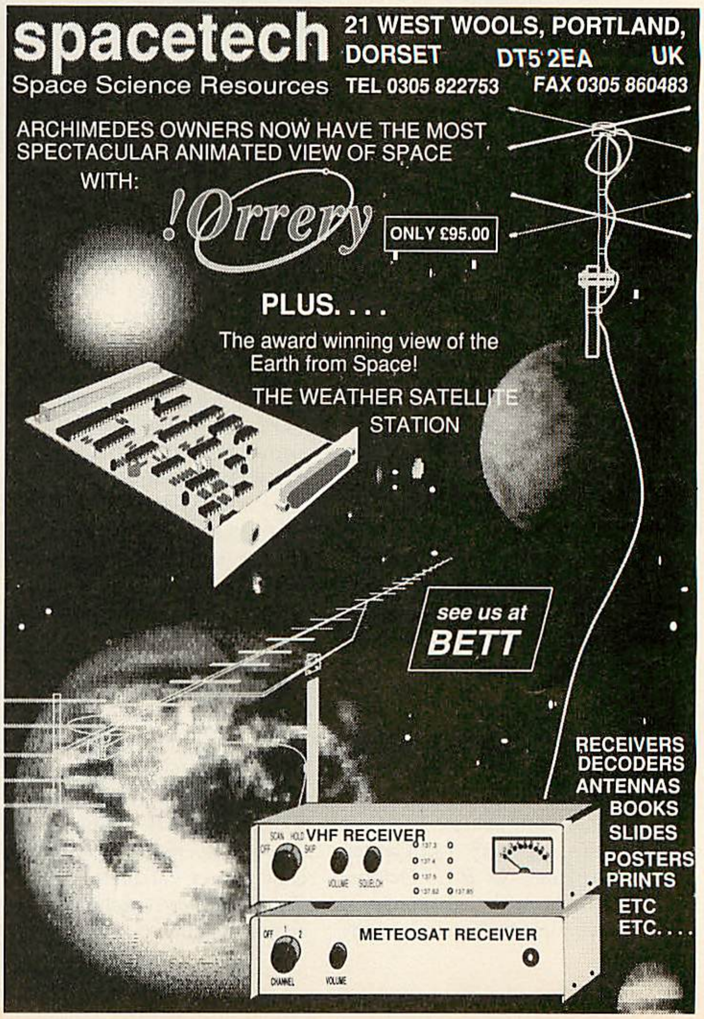
The program works by first opening the file in question for reading and writing and then reading the first 160 bytes. This means that if a file is less than 160 bytes in length, it cannot be edited with this program. The bytes are then displayed, and



Altering disc file contents

the cursor shown – its position is determined by bytex and bytey. The program then waits for a key to be pressed, and takes appropriate action.

ESCAPE (carry set), or ESCAPE simply cause the file to be closed (and updated if any changes have been made). Moving the cursor around is accomplished by increasing or decreasing bytex and bytey as appropriate. Because the system text cursor is used, separate code is not required for its deletion. Scrolling through the file in-



volves altering the pointer value by eight, reading the 160 bytes, and updating the pointer again. Editing bytes entails obtaining the new value (sometimes determined by the old value), altering the pointer according to bytex and bytey, issuing an OSBPUT call, restoring the pointer, and attending to the screen display.

Possible uses for the program include patching up corrupted files copied off a faulty disc, cheating at (unprotected) games by altering the number of lives etc, and even creating custom datafiles for some special purpose. Another use is that of amending textual information for a machine code program, which is usually impossible if you do not have access to the source code. The program can also be used to protect Basic programs, by inserting a &15 code near the start of the program, and an &06 near the end. These codes disable and re-enable VDU output respectively.

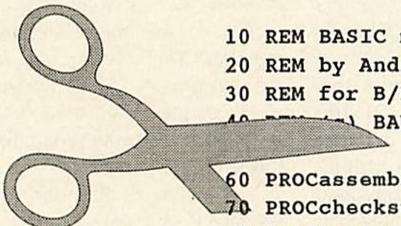
Apart from the inability to work in 20-column modes, there are a few other limitations of the program. You can only edit multiples of eight bytes, ie, the first 8*(<Length in Bytes> DIV 8) bytes in a file, and the program will not work at all if the file is less than 160 bytes long. The text always starts from the top left-hand corner of the current text window, and the screen may scroll if this position is near to the bottom of the screen. The current text window is always cleared on entry. One major problem which is apparent is that if <start address> is beyond the end of the file, the routine will exit with an error message, and the file will be left open. When a *CLOSE command is issued, the file is padded out with zero bytes to make it up to <start address> number of bytes. I am not sure whether this a bug of the ADFS (it is – DA), but it renders *View* files unloadable, although they can still be READ.

The original version of this program had the current 160 bytes of the file stored in memory. This made the scrolling faster, although it was scrapped at the expense of adding the start address parameter (a mixed blessing if you consider the above problem).

£10 BASIC BLOCK LINE SHIFTING

This program provides a quick, simple way of extending Basic programs or making program listings more readable, by taking lines, or blocks of lines, and moving them to the end of the program. The obvious use of the routine is to move growing procedures and functions out of the way, or to cut and paste main program lines when you decide to convert them to a procedure. Another way in which it is effective is joining procedures together. This can be done by simply *BASMOVEing the first group of lines, and then *BASMOVEing the second group, followed by RENUMBER.

The syntax of the utility is: BASMOVE <startline> (<endline>). When you type this the lines in the current Basic program from <startline> to <endline> will be moved to the end of the program. The last parameter is optional, and if omitted will cause just one line <startline> to be moved. The line numbers will be a little strange, but as there is still only one of each line number, RENUMBER will put them back properly, and even deals with GOTOs and GOSUBs correctly. When specifying line numbers, decimals should be used, with spaces or commas used as separators. Remember



```
 10 REM BASIC move
 20 REM by Andrew Pepperell
 30 REM for B/B+/M/C/E
 40 REM (c) BAU Jan 91

 60 PROCassemble
 70 PROCchecksum
 80 PROCsavecode
 90 END
100 :
110 DEF PROCchecksum
120 I%=0
```

Extend your Basic programs, or make them more readable

that you will always need to issue a RENUMBER command after using this utility.

The program works by first converting both arguments to two-byte hex numbers, in accordance with how Basic stores line numbers (apart from the low-high order). Then, <startline> is located, and its address stored. The end of the program is worked out by reading the value of TOP (at &12 and &13), and subtracting 1. This is stored as <nextspace>. Then the program works a line at a time, and copies bytes from <startline> to <nextspace>, storing the current line number at the same time. Then these values are updated, and a check is made to see if <currentline> equals <endline>, and if so the routine exits, moves part of the program down to the original address of <startline>, puts a &FF byte at TOP-1, and finally returns to Basic. If the values are not equal, the process repeats itself until they are.

Because of the way the program works, <startline> and <endline> must exist, or it will crash. Also, there must be at least as much memory from TOP to &8000 as is being moved, or again the program will crash. If in doubt, save the program first.

£10 FILE DATE STAMPER

This involves two programs, *When* and *DStamp* which together are responsible for accomplishing the above function, and both require a single parameter, the filename. This program only works on ADFS.

DStamp reads from the real-time clock (using OSWORD 14) the date, month and year.

It then writes these three things to the file, in a similar way to the File Identification System (see below). The catalogue information is first read, and these three items of data are placed into the MSB of the load address, and the two MSBs of the execution address. This means the program will work alongside the File Identification System, as different parts of the file's catalogue information are utilised by each program.

The date and the year can be read fairly easily, in a BCD-like (Binary Coded Decimal) form, but the month is always displayed as the first three let-

ters of its name – not very helpful. Because of this, the date stamping program contains a data table of these first three letters for each month, and makes comparisons in order to end up with a byte from one to 12 for the month.

This can then be dealt with in the same way as the date and the year. Note that only the 'tens and units' part of the year is saved. So in the year 2000, a different system will be needed!

When performs the opposite function, by reading in these bytes from the file's catalogue information, and displaying them. Note that the century is added to the year number before it is displayed, but this is assumed, not read from the file. A real-time clock is not needed.

DStamp and *When* will work well with the file altering program if the address at which *AltFile* is assembled is altered so that it does not corrupt the date stamping programs.

£10 FILE IDENTIFICATION

The file identification system offers BBC ADFS users the facility, which Archimedes owners have, of setting a filetype for particular files. The function is performed by three machine code files: SETTYPE (followed by the filename, and the type byte), IDENT (followed by the filename), and LTYPES.

SETTYPE will attach a value of byte (which must be in hex) to fname, and this is used later by IDENT . A list of valid byte values can be obtained by typing *LTYPES.

SETTYPE works by first reading in the catalogue information for a file (with OSFILE call 5), placing byte as the second most significant byte of the load address, and writing the catalogue information (OSFILE call 1) back again. This means that it is unsuitable for DFS, as this filing system only allows values of 1, 2, and 255 for this address. Under ADFS, however, any values are allowed, and they do not interfere with the file.

IDENT simply reads the catalogue information for fname, extracts the relevant byte, and compares it with a table (like that used by LTYPES). If a match is found, the text is printed, otherwise the message 'Unknown file type' is produced. Directories are automatically recognised, as 2 is returned in the accumulator after the OSFILE call 5 if the file is a directory.

The values used by LTYPES and IDENT can be altered easily with three entries in the table for each – namely the byte itself, and the address (low-high) of the text, which must also be placed in the program. The table is ended by a zero-byte.

The values I have chosen are fairly arbitrary, but &FF is used for Basic as it allows automatic recognition, &0 (for utility) and &80 (for Rom images) are related to file addresses to make them easier to remember.

The programs will not work with a second processor, as this uses the full 32 bits of the load address to determine which processor to load the file into.

CONTRIBUTIONS

David Atherton welcomes contributions for BBC micros and Electrons, particularly in the field of applications, rather than merely technical issues. If you can't program, mini-articles of (300 to 1000 words) without any listing or programming, are just as welcome. His article on utilities in the special 100th issue suggests some still unexplored areas on the BBC micro.

FIRST STEPS ON THE A3000

Welcome to a new series dedicated to the BBC A3000. If you are a current or potential owner of an A3000, or own an eight-bit BBC B or Master and have considered upgrading to 32-bit, the series should offer an insight into what A3000 and Archimedes Risc OS computing is all about

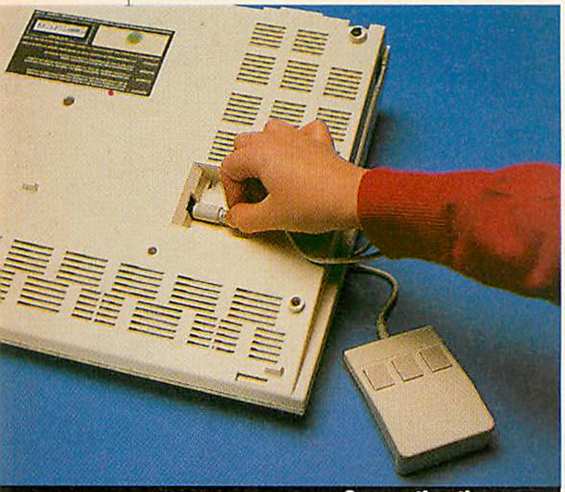


In the first part of our series we start by going right back to basics – what you can expect when you unpack your A3000 and use it for the very first time.

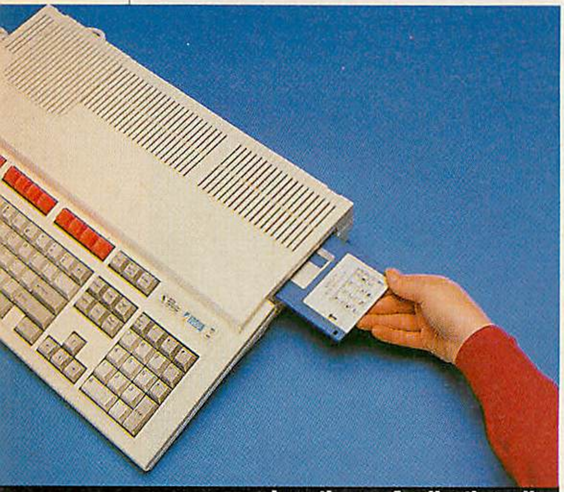
It can be quite daunting facing a new computer for the first time. Will it work? Will it do what I want it to do? What do I do if it bleeps and gives messages like 'Heap Full' or 'Disc fault 18'? By design, your BBC A3000 – with its windows, icons, mouse and pointers (Wimp) operation – makes using the machine easy when compared with many micros. As a new user, Wimp may not mean a great deal to you, but you'll soon discover that it is an easy way of operating which will soon become second nature.

Desktop environment

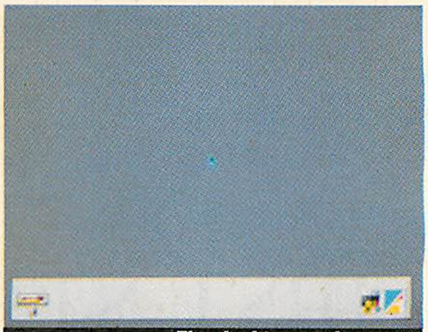
The first thing to do is set your computer up as indicated in the *Welcome Guide*. When you switch on your A3000 you should find yourself in the desktop environment shown here. If your screen doesn't look like this, reset the machine by turning it off and, while holding the delete key down, turning it on again, and finally releasing the delete key.



Connecting the mouse



Inserting an Applications disc



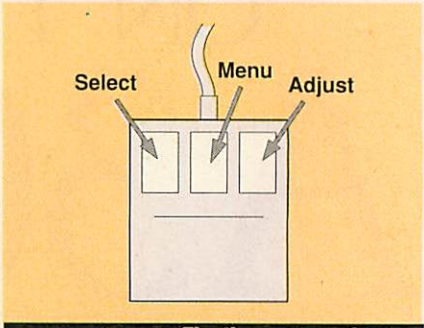
The desktop environment

Mouse matters

Once connected to the underside of the A3000, the mouse is vital for controlling your computer and the applications that run on it. Basically, it consists of a plastic casing with three buttons on top and a ball which rotates underneath.

The mouse doesn't need feeding, but it does have one simple requirement – a small area (about the size of an A4-size sheet of paper) on either side of the computer in which to run around in.

Although happy on most surfaces, mouse mats (rubber or foam) offer additional comfort and, more importantly, grip for the mouse ball. A slipping mouse is also very annoying.



The three mouse buttons

Take the mouse in one hand with the connecting lead coming out of the top end. With your thumb down one side, place three fingers on the buttons and your little finger along the other side.

As you push the mouse around, the pointer on the screen will mimmick your movement. By using the three buttons you effectively tell the A3000 what you want it to do.

Each button has its own function, and it's important to become familiar with each one as soon as possible.

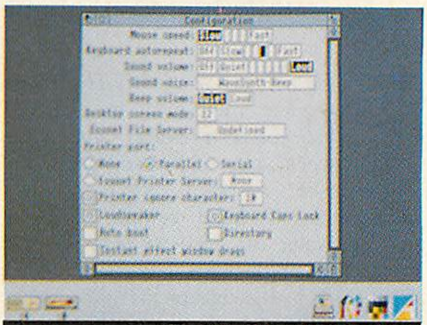


The directory viewer

On the left is the Select button, which is used to tell the A3000 to execute a function or make a selection. Pressing and releasing it once is called clicking and doing so twice in quick succession is called (surprise, surprise) double clicking. Pressing and holding the button is called dragging, a technique used for moving windows around the screen.

The middle menu button causes pop-up menus to appear from the application you are currently using.

On the right is the Adjust button, which performs a similar function to Select in most cases. More about that later.



The configuration window

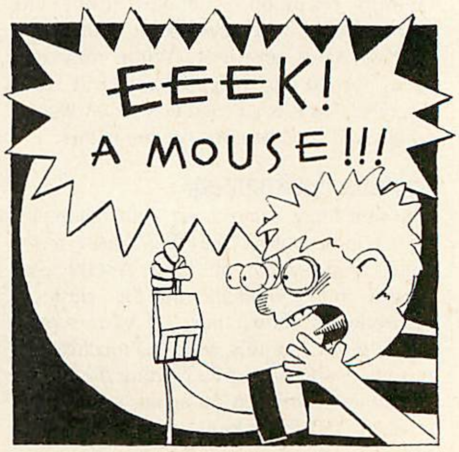
Using discs

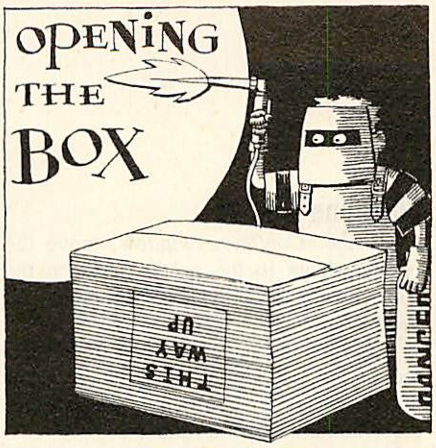
Place *Application disc 1* into the disc drive on the right-hand side of the machine, ensuring you have it the right way up. Using the mouse, move the pointer to the disc drive icon (bottom left on the icon bar) and press the Select button once.

This instructs the computer to find out what is on the disc. The small amber light beneath the green power light on the top right side of the keyboard will glow, indicating that the disc is being read.

Once read, the directory viewer will appear on the screen, which is simply a catalogue of the disc's contents.

It is important that when you turn on your computer you always bring up the viewer of this disc. This is so that your computer sees the !System folder which contains important software that is shared by several applications.





If an application wants something from this folder, the A3000 will ask you to put this disc in the drive. It is a good idea to keep aside a special disc with the !System folder on it. This is because modules are constantly being updated and modified and it is easier to keep track of them this way. More about this later.

Executing an application

Most of the icons on *Applications disc 1* represent applications which are immediately recognisable by the ! (pling) which precedes their names.

The application you are interested in at the moment is *!Configure*. To tell the computer to run the application, move the pointer over it and double click with the Select button.

The application will take a short time to load and then it will appear on the icon bar. This means that the program is running, however at the moment it is waiting until you need it. To use the *!Configure* application, click once on its icon on the icon bar.

A window will appear, offering various ways you can configure your machine. For example, against mouse speed, to alter the 'sensitivity' of the pointer, click on one of the white boxes between slow and fast – the black box will show you the current speed selected.

You will notice that the pointer speed varies as you select different values. You can also choose the sound volume in the same way.

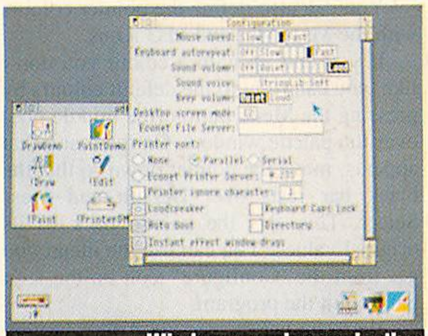
Your computer will store this configuration in memory, even when the machine is switched off. Ideally, you should configure the machine to your own requirements and leave it, but of course this can be changed at any time by using the *!Configure* application. There are many other configuration settings, but more of those later.

Look in the bottom of the window. Among others you will see the instant effect window drags switch (the square box). Ensure this option is on by clicking on it so that a blue asterisk appears in it. To see the immediate effect of a switch, click on the keyboard's CapsLock switch in the window and watch the CapsLock light on your keyboard.

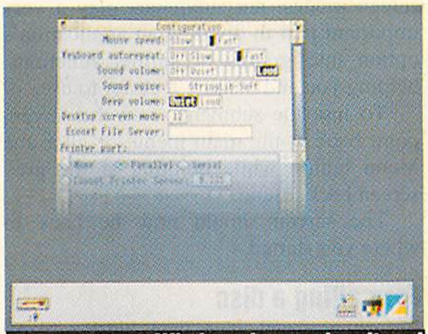
Manipulating windows

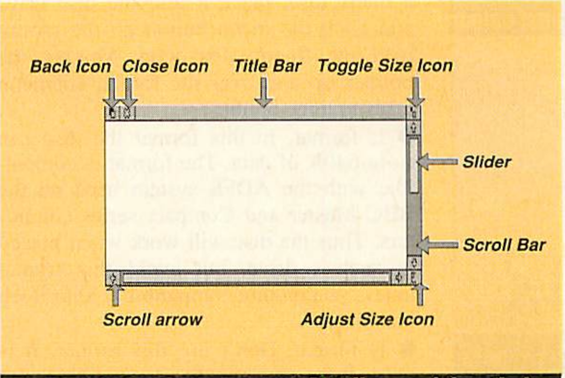
As well as calling up windows, you can also move them around the screen, or overlap them as required. Move the pointer to the title bar (with the word Configuration on it) and hold down the Select button.

By dragging the mouse, the window will move. At the moment the *!Configure* window partly obscures the directory viewer. To reverse that, click on the directory viewer title bar – it will then come to the front, partly obscuring the other window.


Windows overlap each other


Moving three windows around the screen


Window size can be altered



Detail around the window

Now move the directory display so that you can see the title bar of the *!Configure* window and click on it. It will come to the front again.

This window moving technique, along with Risc OS' multi-tasking, means that when you have more than one application running at the same time, and you can bring any window to the front when it's required and put it back when you want to use other applications.

To move whichever is the background window around without bringing it to the front, drag while pressing down the Adjust button (on the right of the mouse) rather than the Select button.

When you feel confident about moving these two windows around, introduce another by clicking on the colour palette icon (immediately to the right of the *!Configure* icon on the icon bar). Try moving windows around and overlapping – it's great fun!

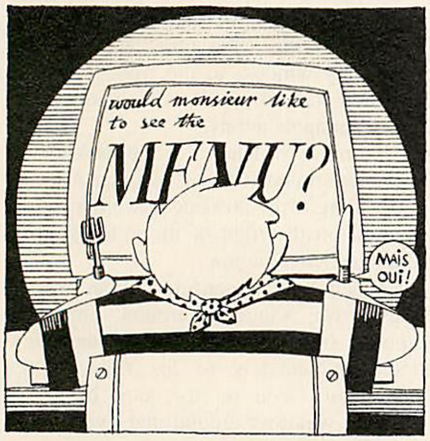
Now close the directory viewer and palette windows by clicking Select on the close icon ('X' at the top left of each window). Only the *!Configure* window should now be left on the screen.

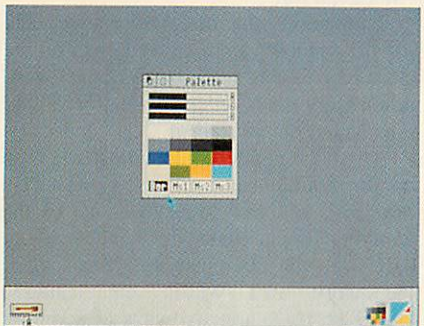
Move the pointer to the adjust size icon on the bottom right of the window. By dragging, you can adjust the size of the window. If you make the window about half size, you obviously won't see all of the work area within the window. However, there are two ways of scrolling inside the window without changing the window size.

Place the pointer onto either of the white bars (sliders) on the right or bottom of the window. By dragging with Select, you can move the sliders, and thus anything inside the window, in the required direction.

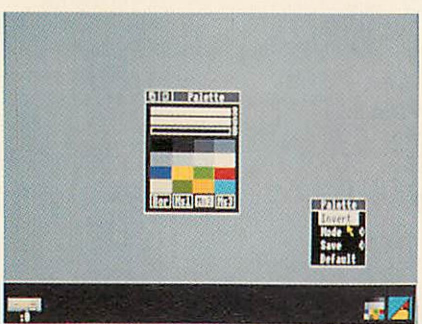
You can also click on to the scroll arrows, with Select or Adjust, to move around the work area without dragging.

By clicking on the toggle size icon (top right) the window readjusts to its full size.




Change colours with !Palette


Choose Default to return to original colour


Screen effect of choosing Invert

Changing colours

Close the *!Configure* window, move the pointer down to the palette icon on the icon bar and click Select, bringing up the palette window.

Click on the square marked BOR (bottom left). You can now alter the colour of the screen border by dragging on the red, green and blue (R G B) sliders.

You can also define the pointer colours with the Ms1, Ms2 and Ms3 icons.

If you end up with a colour you don't like, you can reset to the default colours by pressing the Menu button (the middle one) over the palette window. On the menu that appears, move the pointer down so that the black bar rests over Default and press Select. This sets the palette back to its original values. You can use the menu you get from the 'Configure' icon on the icon bar to quit the program.

Now another use for the Adjust button. Bring up the palette menu again and press Select over the invert option. The screen colours will swop around. Bring up the palette menu again and click with Adjust on the invert option returning the screen colours to normal, but notice the menu doesn't disappear!

Submenus

Move the pointer down the palette menu bar and move it over the small arrow to the right of 'Mode'. This is called a submenu arrow and moving over it and to the right opens up a submenu.

In this case it's just a way of switching screen modes, but submenus play a very important part in dividing an application's option into groups of similar functions, helping you and making it easier to use.

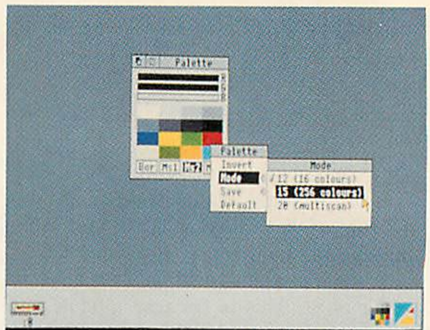
To lose the submenu from the screen, point back at the main menu, or click the Menu button while pointing at the grey screen background.

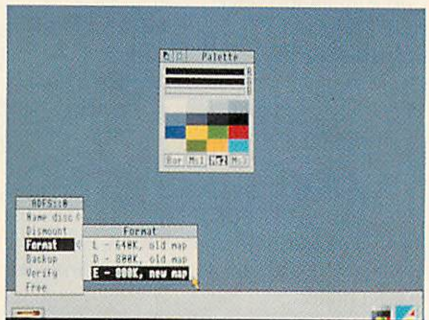
The screen should now be back to where you started.

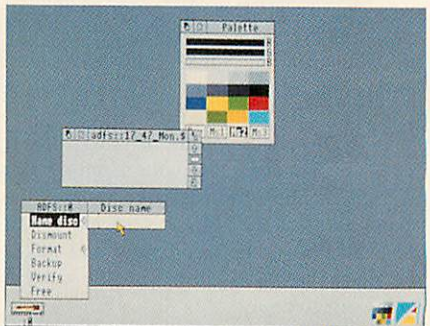
Formatting a disc

Before you can save data onto a blank disc, you have to format it first. To format a blank disc, place it into the disc drive and click the menu button on the mouse over the floppy disc icon. Moving the pointer up and over the format submenu leads to three options:

- L format. In this format the disc can store 640K of data. The format is compatible with the ADFS system used on the BBC Master and Compact series computers. Thus the disc will work when placed in such a drive, but avoid this format unless you require compatibility with Beeb machines.
- D format. Don't use this format. It is only there to remain compatible with earlier machines without Risc OS.


Palette submenus


Format a disc using the E option


Titling a disc

- E format. With this format the floppy disc can store approximately 800K. This format is the one to use with all the A3000/Archimedes machines.

So click Select on E and the computer will ask you if you are sure of your choice. Respond with Yes by pressing the left mouse button and the computer will format the disc. Formatting and verifying messages will appear on the screen and the amber disc light will come on. After formatting, click the Select button again or press Space to continue.

If you bring up the directory viewer, it will now show as a blank window, showing the disc is blank.

To name the disc, press menu over the floppy icon again and move the pointer over the name disc submenu arrow. A small dialogue box will appear with a red vertical line in it. This is the caret and is basically a cursor. Type your name and press Select over the box and it will disappear from the screen. Now if you call up the directory viewer, your name will be in the title bar.

Written by Dave Futcher. Additional text by Paul James.

The pages for this series were produced on an Archimedes 440 using Impression 2 *desktop publishing software.*

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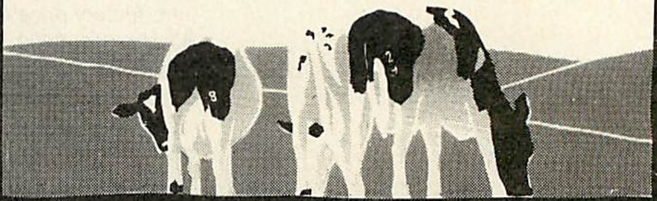
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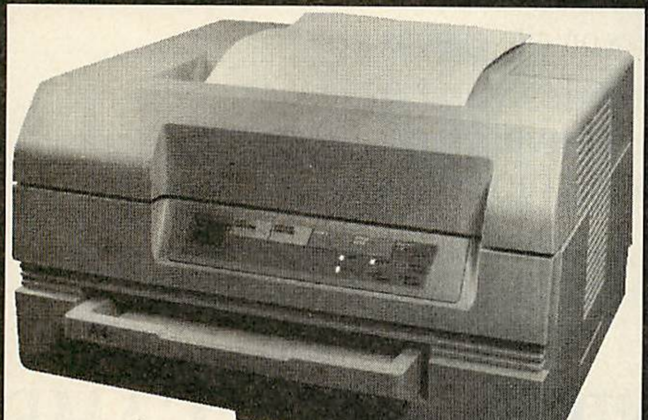
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OPENING ADDRESS

Following his address book program **DAVE LAWRENCE** reveals the technique behind writing such a utility

People often ask me how I set about writing programs – how I come up with the ideas, how they develop and what happens in that all important stage between the theory and their appearance in the yellow pages.

To answer these questions I kept a record of how I went about writing the address book module that appeared in last month's *BBC Acorn User*.

Although I can't actually show you how the code developed, I hope to be able to give you some idea of how to build up a large and complex program from scratch.

The idea was easy enough to come up with – I needed some sort of reliable means of storing addresses and phone numbers. I examined the various options but eventually decided I'd need to write my own program so it would do exactly what I wanted.

I started by writing a prototype of the editor in Basic. This was to form the core of *AddName and *EditName.

I then moved over to Arm code and wrote the module header and decided on the commands the module would provide. I wrote the help and syntax text and set up dummy routines for each of the commands just so the code would assemble.

Building the module

The editor was then converted from Basic into Arm code and went straight on to the memory management coding. As yet I had not decided on a data structure, so this was developed at the same time.

I needed to represent the data in two different forms – a nice compact form suitable for writing to a file and also in a way that could be easily edited.

I set aside a block of the RMA workspace as editing space and allowed the editor to directly access this area. After writing a convertor that took this data and turned it into the compact form, I then wrote the code to insert new entries into the book using the QuickRef as an index.

Next came the routine to find an entry. I first dealt with the QuickRef search, as that was the easiest, and then added extra code to split a name into forenames and surname. This allowed me to write the secondary search based on surnames.

The three commands *PHONE, *ADDRESS and *LABEL were then easy to add.

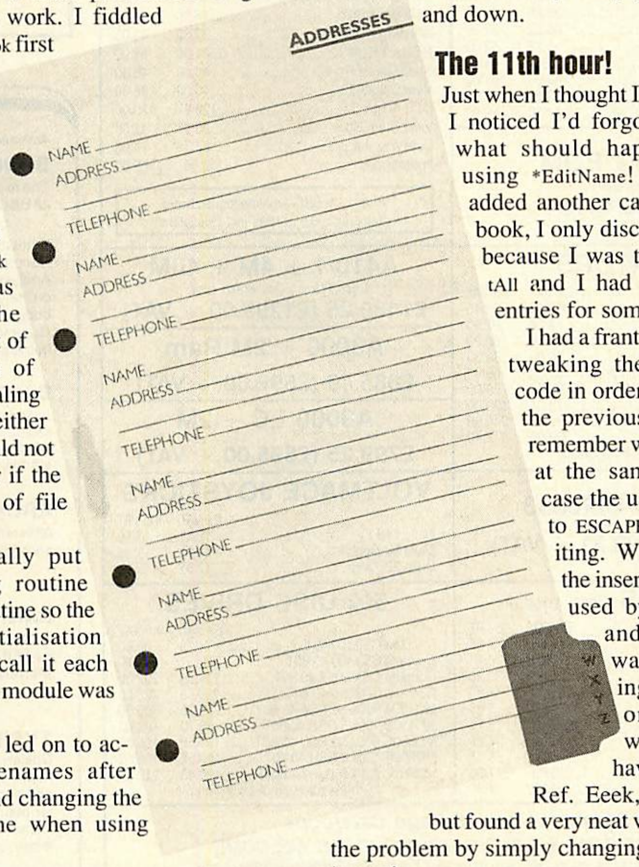
At this stage I split off various useful subroutines, notably one that took a card in 'compact' form and turned it into 'editable' form.

*EditName was next, this was essentially a bit of initialisation followed by a call to the editor, however numerous problems arose, all to do with screen scrolling.

These sorted, the obvious next step was to deal with *NewBook. I ignored the filename parameter to start with as I had yet to deal with files, but simply wrote the code to go through the entire book, freeing the RMA and finally marking the book as empty.

I now needed to deal with files. I decided to do saving first so I could see what I was trying to load in! I set up a default and wrote *SaveBook to use name if no filename was given.

Now there was some data saved, I needed to load it back in. I could see *SaveBook was working by examining the files it saved, so it just took a little persuasion to get *LoadBook to work. I fiddled with *NewBook first and placed actual memory clearing into a subroutine, so *LoadBook could use it as well. The trickiest part of this section of code was dealing with errors, either if the file could not be found, or if the wrong sort of file was loaded.



I eventually put the loading routine into a subroutine so the module initialisation code could call it each time that the module was loaded.

This then led on to accepting filenames after *NewBook, and changing the default name when using *LoadBook.

Testing and tweaking

Most of the work was now done, so I set about trying to use the module and tidying up loose ends.

One tricky part was dealing with ESCAPE during editing. This usually mucked up the screen display so I added code to move the cursor to the bottom of the card before returning. I thought about adding a scan list command, but couldn't think of a nice way of doing it, so I provided the *ListAll command which did the job I wanted.

This needed a few tweaks in other parts of the core of the program, but nothing really drastic.

I then changed the way the cursor keys moved up and down in the editor – previously they went to the start of the new line, now they simply move up and down.

The 11th hour!

Just when I thought I'd finished, I noticed I'd forgotten about what should happen after using *EditName! It simply added another card into the book, I only discovered this because I was testing *ListAll and I had about five entries for some people!

I had a frantic half hour tweaking the *EditName code in order to remove the previous entry but remember where it was at the same time in case the user decided to ESCAPE while editing. Worst of all, the insertion routine used by *AddName and *EditName wasn't working correctly on entries which didn't have a QuickRef. Eeek, I thought, but found a very neat way to solve the problem by simply changing one of the jumps!

With all the coding done, I had a last bug test, tidied up the presentation of the program, added the REMs at the beginning, wrote the article and sent the whole lot off to *BBC Acorn User*.

And that's all there was to it. Easy, eh!?

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SHOWING OFF

MATHEW TIZARD investigates the weird and wonderful world of demos...

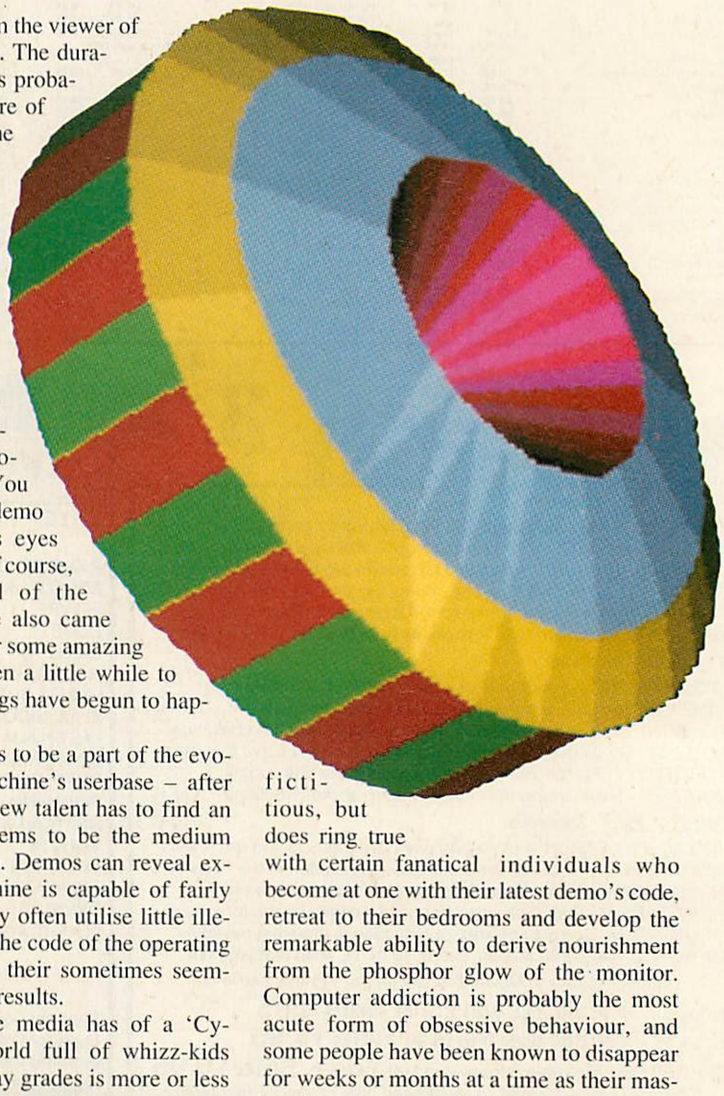
There exists a particular type of program which defies any clear definition. Small, self contained programs, have been around in various forms for as long as home computers themselves. But it's only recently, with the advent of 16, and now 32-bit micros, that they have come into their own. If you happen to possess a 16-bit machine, you will almost certainly be aware of the phenomenon of machine code demos. Read on and learn something new about this intriguing and little explored subject...

Simply, the word 'demo' implies a program which demonstrates something – a new routine or programming technique – and this used to be exactly what they were. Inevitably these interesting little snippets of code would find their way onto bulletin boards and be distributed widely among the owners of the computer in question.

As soon as this started happening, the whole idea began to snowball: people had more and more ideas, experimented, developed other peoples' efforts, and appreciated each other's work far more. A sort of friendly competitiveness arose, and before anyone knew exactly how, an entire mini sub-culture had developed around these programs which were highly technical, but fun as well.

It was not only the writers themselves who were swapping and enjoying the things they came up with, but an entire section of the non-programming computer fraternity. This was because the demos were almost always graphically interesting, sounded good, and were, on the whole technically stunning, which ensured that you did not have to be a computer genius in order to appreciate them.

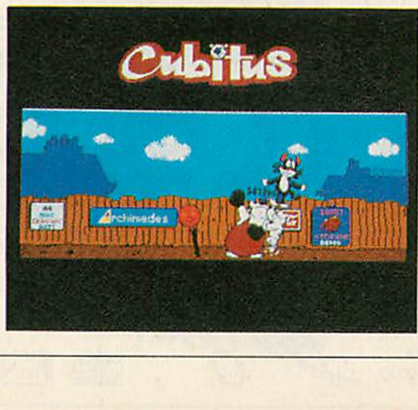
The programmers stretched their machines to the limit in every way they could think of and because the end product was often completely useless, just mouth-wateringly clever, they did not have to worry about using their routines productively, in anything practical like an application or a game. In a nutshell, I think the main reason for writing them at all is to illicit a momentary gasp of wonderment (how the hell did he do *that* !?) from the viewer of the finished demo. The duration of this gasp is probably a good measure of how successful the author has been!



Obviously, to be impressive, such routines require hardware with the potential to be impressive. With each new and more powerful machine the results become progressively better. You can't produce a demo to make people's eyes pop on a ZX81! Of course, with the arrival of the Archimedes, there also came the opportunity for some amazing demos. It has taken a little while to get going, but things have begun to happen on the Arc.

It actually seems to be a part of the evolution of a new machine's userbase – after a short time, the new talent has to find an outlet and this seems to be the medium most often chosen. Demos can reveal exactly what a machine is capable of fairly early on, since they often utilise little illegal backwaters in the code of the operating system to achieve their sometimes seemingly impossible results.

The image the media has of a 'Cyberpunk' underworld full of whizz-kids changing their essay grades is more or less fictitious, but does ring true with certain fanatical individuals who become at one with their latest demo's code, retreat to their bedrooms and develop the remarkable ability to derive nourishment from the phosphor glow of the monitor. Computer addiction is probably the most acute form of obsessive behaviour, and some people have been known to disappear for weeks or months at a time as their masterpiece nears completion.



The results of this kind of programming (to the exclusion of everything else, bar coffee drinking) are usually superb, but I can't help wondering whether it's worth the effort!

I often hear people dismiss out of hand the whole ethos behind demo-writing, yet these people invariably have at least a directory full of them on their hard disc! In fact, on every hard disc I've ever encountered there has always been at least one or two lurking somewhere. This great popu-

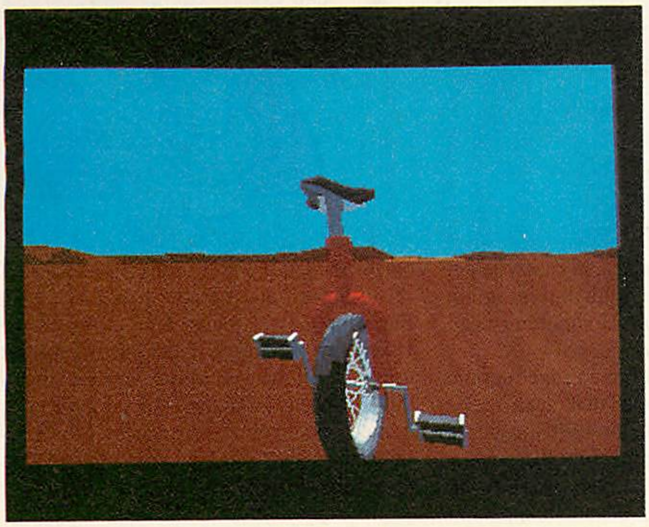






larity demonstrates the accessibility of demos – it is not necessary to understand their innermost workings to appreciate them. They seem to be inherently collectable.

Certain writers in the 16-bit world are as close to being mega stars as it is possible in computing circles, and their work certainly holds cult status among their followers. 'Fans' avidly keep up to date with the progress of their favourite writer's latest magnum opus and, once they have it, distribute it among their friends. Programmers like this are now making names for themselves (if not fortunes) on the Archimedes scene and some are remarkably well known.



So, what can you expect to see in your average Archimedes demo? Well, like their 16-bit counterparts, they are difficult to pin down to a precise definition, but some features are fairly common throughout: scrolltexts are a good example.

These are long, convoluted messages which used to creep tediously across the foot of the screen, but nowadays tend to bounce around all over the place in every way imaginable.

The actual content of the text is largely irrelevant and it is often amusing to see that someone must have laboured for hours on a routine to bounce a message written in a pulsating multi-coloured 3D font around the screen only to end up saying something along the lines of 'Greetings to Dave and Kev'. Almost every Archimedes demo I've seen so far has had a scrolltext of some kind ranging from the simple to the bizarre, and they always contain something like a short novel's worth of 'hello's to everyone from the author's mum to their university tutor. It has now reached the stage where they actually make fun of each other's cliched style.

Once in a while though, you might come across a scrolltext with something worthwhile to say. Some are positively hilarious; crammed full of witticisms and wry humour. Probably the best exponent of this is Alt_Man, and there'll be more about him next month.

Another favourite among demo writers is the star field. These are *Elite*-like scrolling panoramas of space, which vary in quality quite widely.

The best have several layers of shaded parallax scrolling which add a convincing depth, and give a real feeling of motion. Some have even been developed where the stars spiral inwards into a black hole. All these frills though – the messages and the stars – usually serve as a frame around the centrepiece of the demo, which is the 'demonstration' itself. This can be anything from a revolving teapot to a spinning globe with a picture wrapped around it, and is the idea which forms the kernel of the demo.

Sound usually comprises a 'song' ported from a different machine, which uses four voices (tracks) to play samples at various pitches.

If all this has piqued your curiosity, you might be wondering how to get hold of some of these amazing programs. Well, any bulletin-board worth its salt will have a selection of the most up to date. Once you have two or more, it should be easy, as addresses and phone numbers are usually given in the scrolltext messages (so they do have a use after all!) Another source, if you don't have a modem, is through public domain software discs. Most of the better PD distributors will have a few demos in their collection. Every one I've come across has been free of charge, but public domain software often has a minimal charge on it to cover copying time etc.

The box below lists the best demos I've found so far, together with their writers (or place of origination)...

I have decided not to give the addresses of the various sources as I'm sure they would not appreciate crowds of demo hunters beating down their doors and jamming their phones.

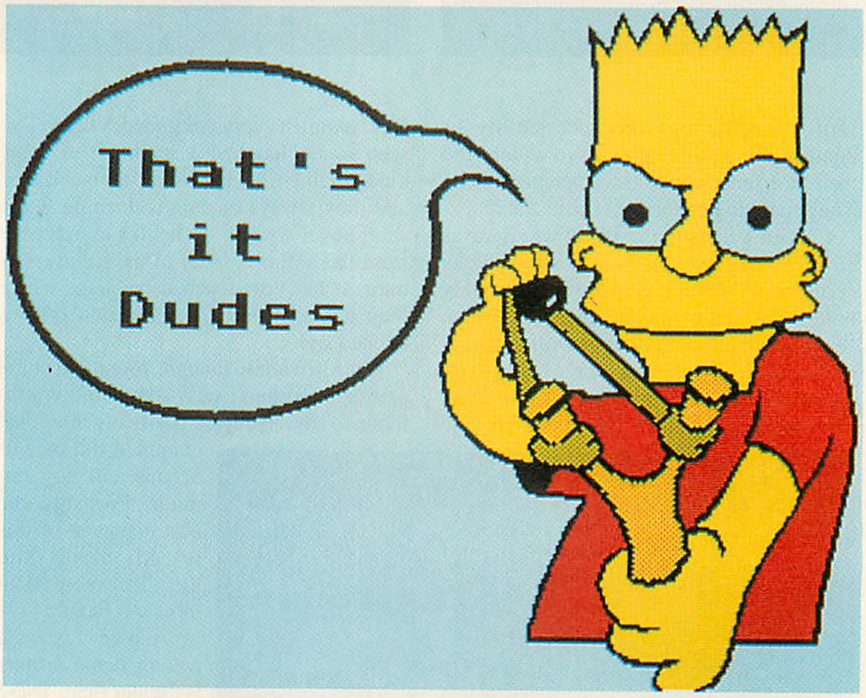
However, it is not difficult to find demos, and they really do pop up everywhere. If all else fails, have a look in your local hardware dealer's shop, as they are often useful for showing off the capabilities of the Arc.

WRITE TO . . .

- Brothers in Arm – *!Bounce, !Rotate, !!TechTech, !0_Borders, !BIATetris, !Sister, !Z_Brother*
- MJD Software/ Mark Davis – *!Demo* (imaginatively titled!)
- Noah Professional Software – *!FSM_Demo1, !ColDemo, !Demo3, !Demo6399*
- Michael Archer – *!Balls*
Alt_Man – *Demo-I, Demo-II, Demo-III, Demo-IV, Demo-V*
- Fabrice Mercier/Arcangels Team – *!BallsDemo* (2 versions, different music) *!ArcAngel*
- Acorn – *!DeskBalls, JACK2,* (David Braben) *Logo* (David Braben) *Tanks,* (early stages of *Conqueror*)
- Clares – *!TheMask Sound, Graphics Demo Disc*
- Paolo Baerlocher – *Rotating3D*
- Dt-Software – *!DemoGe72*
- Ian Griffiths – *!Flump1*
- Zeus – *!Teapot*
- Bjorn E Flotten – *!PDemo*
- Zodiac/Claudio Selber – *ZappelDemo Zodiac*
- Armaxess – *Armdemo Process Spares Veccy*
- Archimedes Medway/Tony Porter – *OverScan01*
- Brother Insane/Orpheus – *!IdiotDemo*
- Justin Fielder – *Demo 1 Trillion*
- Unknown author – *Arabela*

DRAWING CONCLUSIONS

JAMES RICHARDS paints the complete Picpac picture



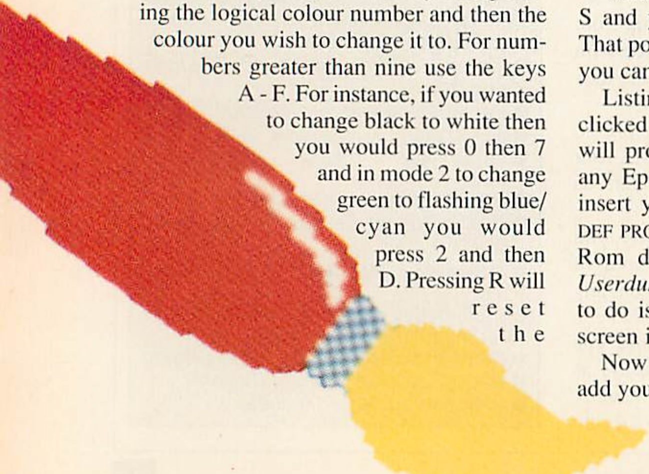
Well folks, this is the third and final part of the series. This month I shall add the finishing touches to the *Picpac* graphics package with the following:

- A fill routine
- An examine picture routine
- A partial screen save routine
- A printer dump

I will also explain how you can add your own utilities to the package using the user icon and I'll provide a demonstration utility. First things first. We have seen how easy it is to create the package with a few simple modules. As long as you have a basic skeleton that takes into account all variants then life becomes easy. You can change each module to suit your personal taste, or you can of course re-write entire modules. I hope this helps you develop a package that you really enjoy using.

Right, back to work. Type in listing 1 and save it in your *Picpac* directory as 'Fill'. This is a very simple fill, it isn't a flood fill. I find that it's much more preferable, and sometimes quicker, to do it yourself. Of course if you want, you could take Peter Sandford's fill routines from *BAU* January 1985 and plop them in DEF PROCfill. Alternatively Master and Compact users could insert PLOT 141,x%,y% in place of the PLOT 77. This performs a flood fill.

Now, what use would a graphics package be without a facility to let you admire your work? Listing 2 allows you to do just this. Type it in and save it into the *Picpac* directory as 'Look'. It simply loads the work file to the screen and then lets you redefine its palette. Do this by first pressing the logical colour number and then the colour you wish to change it to. For numbers greater than nine use the keys A - F. For instance, if you wanted to change black to white then you would press 0 then 7 and in mode 2 to change green to flashing blue/cyan you would press 2 and then D. Pressing R will reset the palette to its default values, in case you get too confused. To exit from this program press ESCAPE, (hopefully I shouldn't need to tell you that by now).



Listing 3 is a partial screen save routine. I use it to save screens that need to be merged together or that don't use the whole work area, thus saving precious disc space. When you click upon its icon the workfile is loaded. Two flashing lines will appear at the top and bottom of the screen. These are the lines that bound the area to be saved. Keys A and Z move one line up and down and : and / move the other.

When you have selected your area press S and you will be asked for a filename. That portion of the screen is then saved and you can repeat the process.

Listing 4 is a simple printer dump. When clicked upon, your work file is loaded. It will produce a black and white dump on any Epson compatible printer. You could insert your own routine in the procedure DEF PROCdump, for instance, if you have a Rom dumping utility, like *BAU*'s own *Userdump* Rom. Then all you would have to do is insert the command to dump the screen in PROCdump. Simple, eh?

Now onto using the user icon and how to add your own special routines to *Picpac*.

Two icons on the menu screen correspond to the user utility. These are the set user icon and the question mark icon. Put simply, you place your utility in the Userprogs directory. Clicking on the set user icon allows you to type in the name of this utility and from then on, until you reset it, the question mark icon executes this chosen utility. This is done in the same way as the Icondrive and Bootstrap programs, save a few minor alterations.

Listing 5 is the Set user program, save it as 'SetUser' in your *Picpac* directory. This program asks for the filename of the utility and places it at &90A.

Listing 6 should be saved as 'UserLink' in the *Picpac* directory. Like Icondrive it chains the filename at &90A, except that it doesn't load in the workfile, why? Because your utility may not need the workfile loaded to work upon.

Listings 7 and 8 should be saved in the Userprogs directory as 'WkLoad' and 'Rerun' respectively.

If your utility is a screen editor then you will want to have the workfile loaded. This can be done by inserting this line at the very start of the program

```
IF I%=FALSE THEN CHAIN"WkLoad"
```

When the utility is entered I% is FALSE. The program 'WkLoad' is then called which changes mode, loads the workfile and sets

I% to TRUE. It then chains your utility, which of course now knows that the workfile is loaded and then allows you to edit your screen. This alleviates having a procedure to *load* the workfile in every program you write. If you wish to provide an undo option, as you jolly well should, then when I is pressed all you need to do is CHAIN"WkLoad".

If you have a screen to save when ESCAPE is pressed from within your program, chain, then program 'Rerun'. This performs the same function as the BootStrap program, saving the workfile and returning to the menu. You may not have a screen to save. In this case all the program needs to do is chain the menu using the lines:

```
*Dir $.Picpac
CHAIN"Menu"
```

Here are a few guidelines to stick to when writing your own utilities.

In screen editing utilities Z X : and / should always be used for direction keys, no messing about with the soppy cursor keys please.

Keys 1 to 4 should adjust the speed of the cursor in steps of four.

In utilities that have an adjustable size cursor you should implement this in the same way as my Circles and Copy routines do it. That is holding down SHIFT, in conjunction with the direction keys, to adjust the dimensions of the cursor.

In utilities that don't have an adjustable cursor then SHIFT could be used to speed up

HOW TO SAVE YOUR LISTINGS

Listing 1 - $.Picpac.Fill
Listing 2 - $.Picpac.Look
Listing 3 - $.Picpac.Partsave
Listing 4 - $.Picpac.Pdump
Listing 5 - $.Picpac.Setuser
Listing 6 - $.Picpac.Userlink
Listing 7 - $.Userprogs.Rerun
Listing 8 - $.Userprogs.WkLoad

KEYS FOR FILL

Z X : /	Move fill cursor
RETURN	Fill
I - O	Load/Save workfile
ESCAPE	Quit

KEYS FOR LOOK

0 - F	Select logical colour, then
:- 0 - F	Select physical colour

KEYS FOR PARTSAVE

A Z	Move first bounding line up/down
/ :	Move second bounding line up/down
S	Save selected area
ESCAPE	Quit

KEYS FOR SUPERTEXT

Z X : /	Move point
SPACE	Enter text
A	access attributes
ESCAPE	Quit



the cursor – self explanatory really. The undo function should always be implemented in your programs. Pressing 'S' should save the screen under WkFile and pressing I will simply CHAIN"WkLoad" (see the rubber band listing in the November issue for an example of how to do this).

When ESCAPE is pressed within your program this means the user wants to exit to the menu. Your program must do this by CHAINing 'Rerun' or the menu.

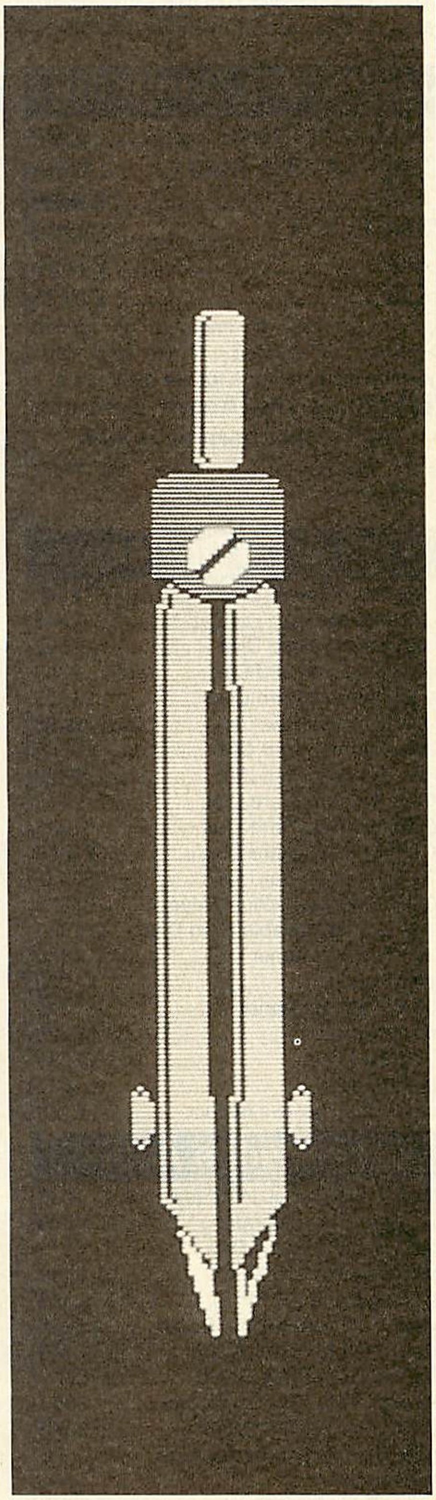
There are a few constraints for your programs. Stick to them, it'll make using the package a whole lot easier.

Now onto the extra program I have supplied as a demonstration of adding your own utilities to *Picpac*.

I call it *Supertext*, shown above. It allows you to squeeze any text into a quadrilateral. Type in listing 8 and save it as *Supertext* in the Userprogs directory. You can now select it by clicking on the setuser icon. A catalogue of the directory will be shown. Type *Supertext* at the prompt and the menu will come back up. Now if you select the user icon, the question mark, then *Supertext* will be loaded.

This is a rather clever utility, even if I say so myself. It relies heavily upon good old Pythagaras rule to squash your chosen string into any quadrilateral that you define. In the centre of a screen is a small dot. This is the start of your quadrilateral. You can move this about to define the start of the path. RETURN fixes this point and allows you to draw the bottom line along which your text rests. This means that if this first line is plotted from left to right your text appears backwards. The next two lines bound the rectangle. You then type your text in and it is squished into shape. Try experimenting with this for some really weird effects!

Another feature of *Supertext* are text attributes. You access these by pressing 'A'. Foreground and background colours can be defined. The clear box attribute determines whether or not the quadrilateral is filled to the current background colour before plotting starts. Answering yes to the points option makes sure that when plotting, only a



single point is used, which is useful for plotting small text. Saying yes to the outline option means that the individual 'pixels' that make up the text are just outlines, not filled rectangles. Leave box replots the outline of your quadrilateral and Corner box just plots points on the corners.

Well that's it, you've got your graphics package. Now get to work on it as I suspect there are a few things you are going to change and add.

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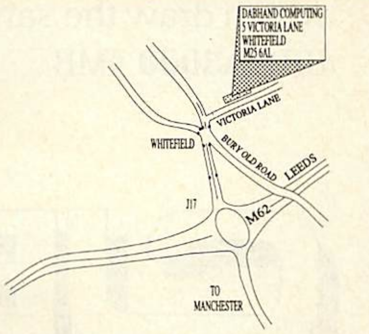
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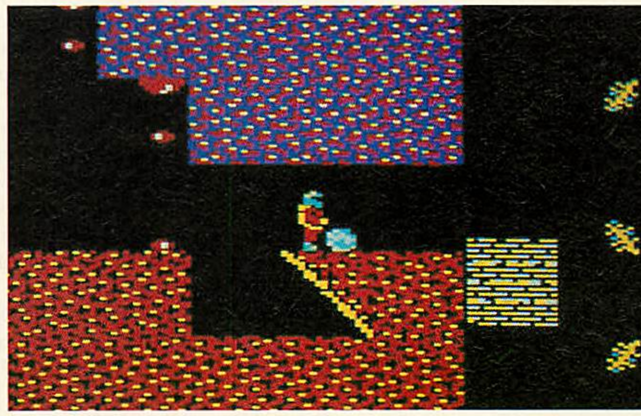
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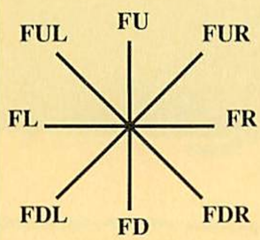
SAM GREENHILL wanders the corridors of Superior Software's popular graphic adventure and finds there is a way out





KEY TO EXILE SOLUTION

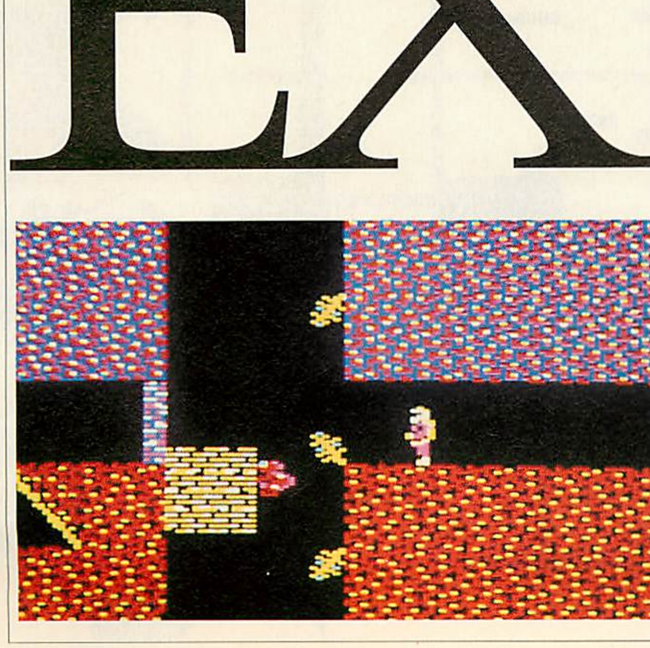
Teleport to last position	T
Remember position	R
Goto	}
Press Switch	PS
Pickup	P
Store in pocket	S
Get from pocket	G
Drop	D
Throw	TH
Shoot/Fire	F
Get the hell out of there	*
Save game recommended	SAVE

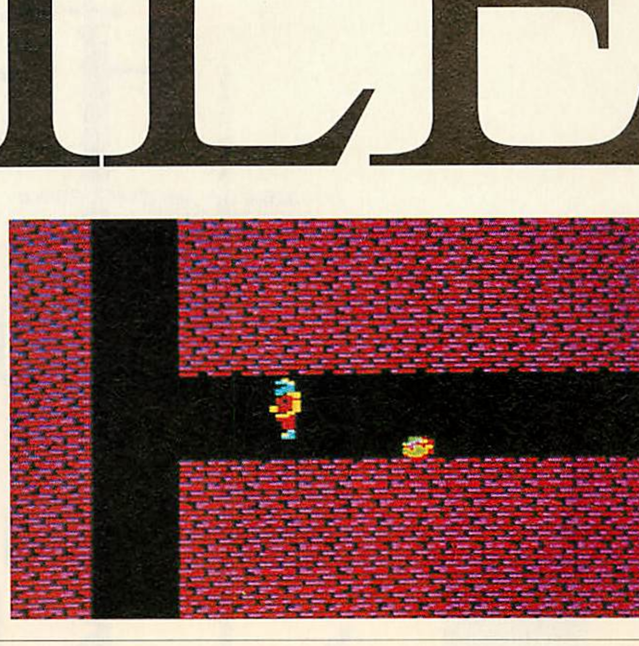


The text overleaf describes a sensible route through Superior's brilliant arcade-adventure, *Exile*. It is still available, and can be purchased by contacting Superior on (0652) 58585. Our thanks to both Superior Software and the authors of *Exile*, Peter Irvin and Jeremy Smith, for their help with the map and solution. Although you have probably completed the early stages of the game you are advised to start again in order to maximise your energy.

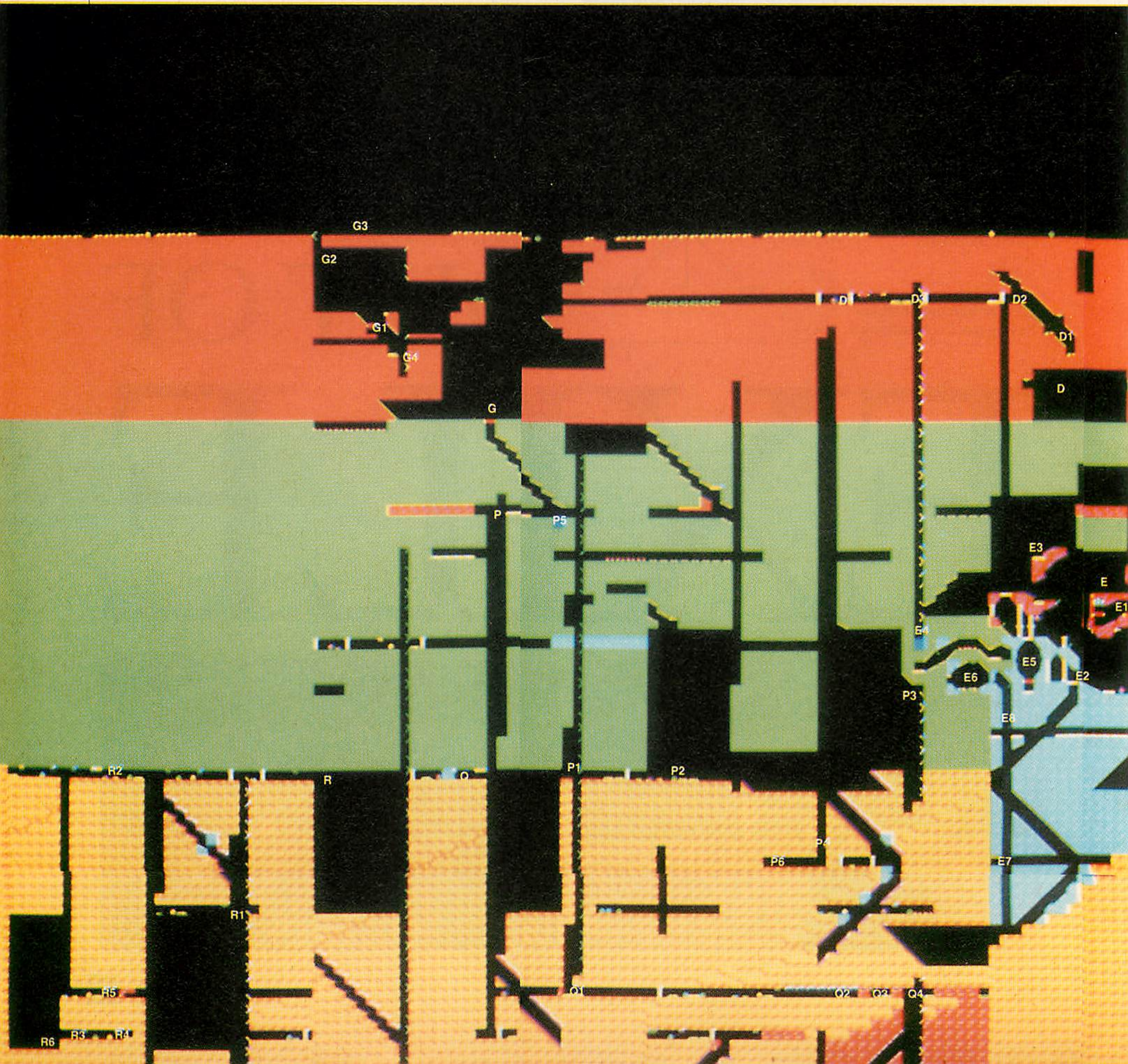
You must decide when to remember your position or save game, depending on your own skill, but you are advised to do so when recommended in the text. Due to lack of space, the solution is semi-coded so it would be a good idea to make a brief written note of each instruction once you've decoded it, for later reference. The solution will be continued in the February issue and concluded in March. The second half of the map will appear in the March issue.

OUT OF EXILE





(1) PS at (A) to unlock doors. Then }B and R. FR to bush and find grenade. P and S. T R.
(2) (Optional) Stand at (B4) and do a big jump. FU to (B1) to get grenade.
(3) }B3. TH grenade right at wall, so it bounces and lands on door. If it doesn't, you'd better hurry and pick it up. Disarm it using SPACE, and try again. When correctly placed and primed: *.
(4) }B5 R. FDL then FUL along diagonal shaft, then FD the vertical shaft. If you haven't got this far yet, then you should now explore. (And you shouldn't read on!).
(5) (Optional) }D) Don't shoot the bees, you will need them later. P grenade and S.
(6) }E R. To remove annoying bird lead it to (F) and provoke the turret.
(7) (Optional) Blow the door at (E1) and P pistol. Dispose of 'Harry' at (F) or lose him on the planet's surface.
(8) (Optional) }H1 P grenade – remember you cannot hold more than four objects, and grenades cannot be dropped without priming them.
(9) Fly through annulus at (E2).
(10) (Tricky) }E8 R. }E6 P flask and FR and TH flask through door. Then T back to (E8) and catch flask. Fly through (E2), noting that you can do this only when facing right. Something about the planets' strange magnetic field. (}E4). Kill any remaining yellow birds.
(11) Fill flask with water and carry it to (E5). R D. SAVE. }E2.
(12) T to (E5). P RCD and S. Take flask to (E). D RCD at (E). }D1 and P key. }E and if you skipped instruction (7) then use RCD to get pistol at (E1) and deal with Harry as per (7).
(13) }G2 via transporter at (E1) or fly via (D3). R and FU slowly to get or knock key at (G3). If you fail T and try again. Then }E.
(14) R then }D. Fill your pockets with bees. Note that when they are taken out they are more vicious. T back to (E) and go and rouse the imps. Hold out a bee for an imp. When the imp that eats the bee gets back to the nest it will give you a present. There are four to be taken. Imps are frightened by noise and being hurt so shoot it to get it back to its nest.
(15) With the RCD, carry the flask to (C). Shoot wasps then R and open the door with the RCD.
(16) }C2. Grenade pink robot or shoot it off the edge. Stand on the right of the pink chest and shoot the top left-hand edge. This moves the table, allowing you to descend through the secret passage below.
(17) Harry's avenging brother and some more wasps lurk in the tubes – deal with them quickly.
(18) Stand at (C3) and shoot the Icer into a transporter. R then follow it and P. Experiment



with the switch (shoot it) and the transporters.
(19) }H via transporter. Deal with the wasps and P the key. Explore this area. }C1 and shoot the pink robot to death if you have not already done so. Then, use either two grenades to kill the red robot or push it into the pit using either the icer or by pushing the pink chest towards it. }C5. Go into transporter to (F1). Kill nasty birds, and FU to collect power pod. R then FD and lie down in hollow. Open door with RCD. Still lying down shoot the jet pack booster off the ledge above (F2). Close the door. }F4 (teleport?). Shoot robot off cliff, collect power pod and P jet pack booster. SAVE.
(20) Using transporter at (C3) take the flask to (H). Leave it there and }H2. D RCD, then }H3 with the flask. D flask and }H4. FR fast using @ to (H5) before the door closes. Collect all the power pods. Quickly explore this area.

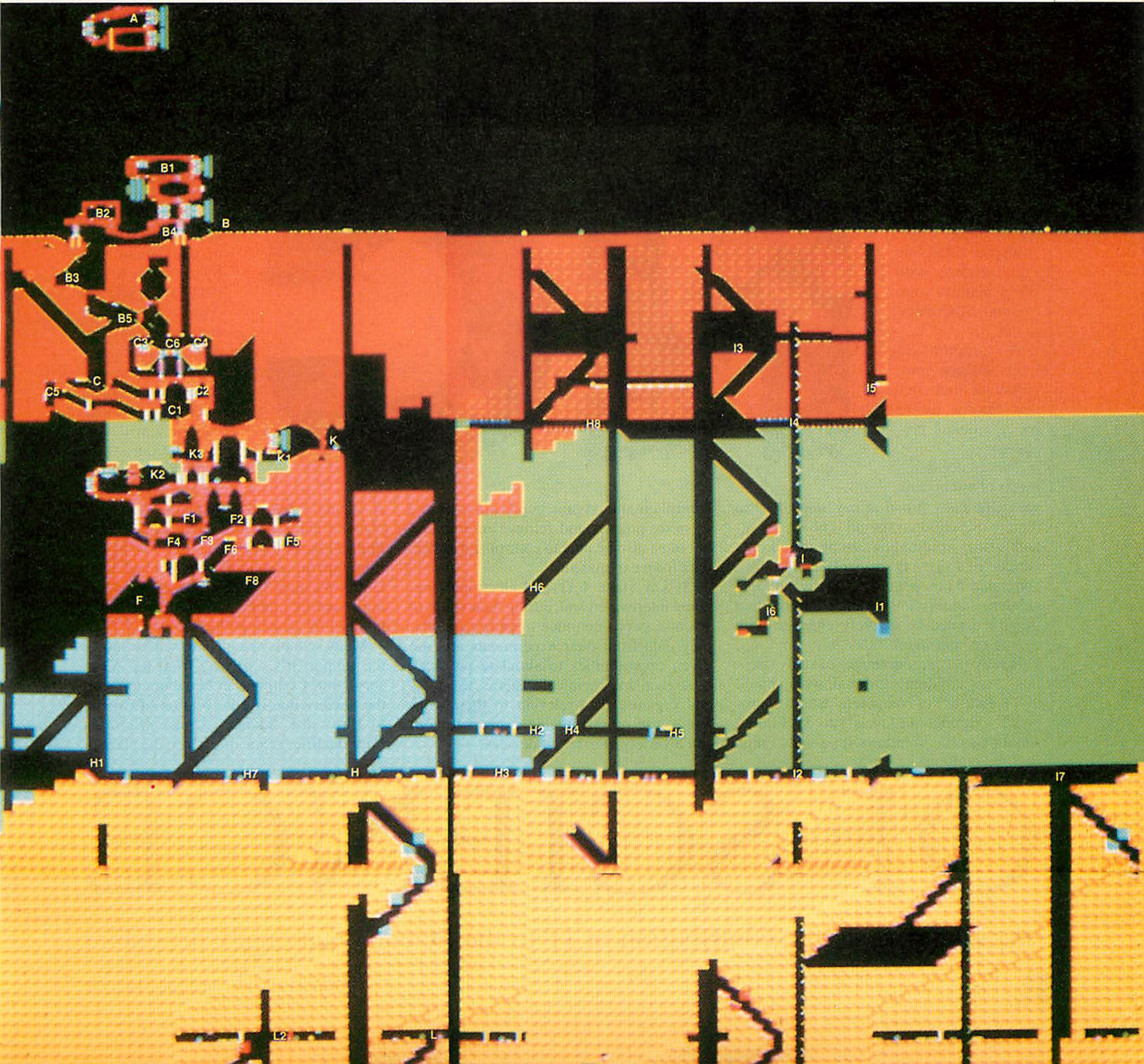
(21) Take the flask to (I1) via (I2). Fill with water then take it to (I3). D and R. }I5, scroll down, and see Fluffy. Fluffy is frightened of noise and being hurt. }I4 and F at ground. Fluffy will come to you. Take it to (H6) and leave it there.
(22) }I. Lie down and F switch through crack. R near switch then get flask of water and place at (I). T PS. Take flask to (I6) and TH it up so that it bounces and hits the switch. FD and P key.
(23) PS, leave the boulder exists only in case you lose the other one, and }C4 (teleport?).
(24) Set switch to destination (H7). Send a grenade through to (H7) then check (H7) is no longer hostile. Set the transporter at (C3) to go to (B1). }D4 and switch on transporter using RCD. }H via transporter. Take Fluffy into transporter at (H). Fly it to (C4). F switch once and, with Fluffy, }H7 via transporter at C4. SAVE.

(25) (Tricky) You and Fluffy should now be at (H7). Open the door. <D> Fluffy and <}F6>. Fill the wasps with lead. Take Fluffy to (F6) and throw/push/shoot him through the crack to (F5). You will hate Fluffy very soon.

(26) Without being seen by fluffy allow him to hit the switch at (F5) ONCE. Then quickly show yourself and make lots of noise. Retrieve Fluffy before he hits the switch again. The turrets at (F) and (F2) are now inactive. <}F5> via (F4). <PS> lots of times. Collect all the power pods, and remember to leave the switch in a safe position.

(27) Take Fluffy to (F). Use him to get the whistle. Leave him there. <}H8> and shoot the boulder out of the mushrooms. Take the boulder to (H3) and <D> your RCD. <SAVE>.

To be continued next month...



APPLIANCE OF SCIENCE

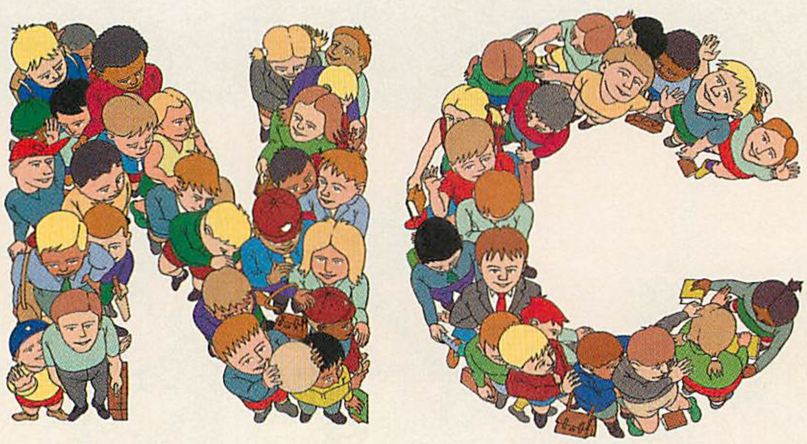
CHRIS DRAGE reveals the contribution of IT to the Science National Curriculum

Acorn's Archimedes/A3000 computers are well placed to help deliver the science National Curriculum as their superior graphics ability and fast processor speeds make them ideal candidates for data processing and display.

Above all, Risc OS now offers a consistent working environment where operations such as filing are all performed in the same manner, and data can literally be dragged to wherever it is needed.

Those readers who have moved from BBC B or Master 128 computers to the A3000 may consider purchasing the Pres A3K6/A3K12 (external disc interface/Arc-DFS) system for at least one of their machines. Once installed, and with a 5.25in floppy drive (with psu) fitted, the Pres interface will permit many of your existing BBC discs to run.

A number of Beeb science programs are discussed here but the list is by no means exhaustive.



The science statements of attainment are sufficiently broad at key stage 1 as to require that children should 'know', for example, that information can be stored on a variety of everyday devices, including a computer. At no point do they demand that children 'understand', which implies that they then must be actively engaged with computers and so on.

However, the programmes of study stress that young children's 'normal' work should involve the use of computers 'where appropriate'. Throughout levels 1 to 3, children should become familiar with a wide range of IT devices. At key stage 2 they should be given opportunities to use and investigate the transmission and storage of information using 'the computer, sensors and the telephone'.

The emphasis here is on children using computers to store, retrieve and present their work, corresponding closely with attainment targets relating to IT in the English National Curriculum.

At key stage 3 the focus is firmly on control technology and datalogging/monitoring. The programme of study even lists the environmental factors which will activate sensors! A systems approach is to be adopted throughout with sensors, output devices and logic gates combined in simple control circuits. Again, pupils are expected to store, process and retrieve information but must also be able to control and collect data from experiments.

At key stage 4 IT and electronics become intertwined and, during their study of science, pupils continue to gather and display data from their experiments and are given opportunities to simulate physical, biological and chemical systems, to access and organise data relevant to their work and to use programmable systems to control a variety of external devices.

Throughout the science orders, data handling is of paramount importance as far as IT is concerned. *Key Plus* (ITV Schools) is an information-handling program which is extremely well placed to assist in this respect. It is a relational database system offering a full Risc OS Wimp environment, improved graphics, speed and a video frame grabbing capability for pulling images from video discs.

Key has sold widely into schools because it has been so cheap and has been admirably supported by datafiles and associated resources by ITV.

Existing datafiles, like the popular *Animals In Action* and *Earth Sciences* series, will be among the first to be converted and enhanced for the Arc. The *Key Plus* mapping facility is considerably enhanced with more detailed maps and by the ability to display information from different sources on one map. Similarly, each datafile will be enhanced by additional information. As a result they will cost more than their eight-bit predecessors.

A totally integrated mapping system is planned and data links with loggers like Phillip Harris' EMU/Datadisc Plus, LogIT from Griffin and George and the Advisory Unit's Weather Station are all on the drawing board. A junior version of *Key Plus* is planned for launch in the new year.

Many schools using *Quest* will welcome the support it's receiving from the Advisory Unit. Compiled in collaboration with the Society For The Prevention of Cruelty to Birds, the Advisory Unit's *Migration Pack* datafiles refers directly to the place of

datahandling in science, maths, technology and geography for key stages 2 to 4. The suite of resources includes a disc of data files, a set of workcards, a handbook and an RSPB video entitled *Migration Mystery Tours*. Archimedes Quest and Qmap are both required to use the *Migration Pack*.

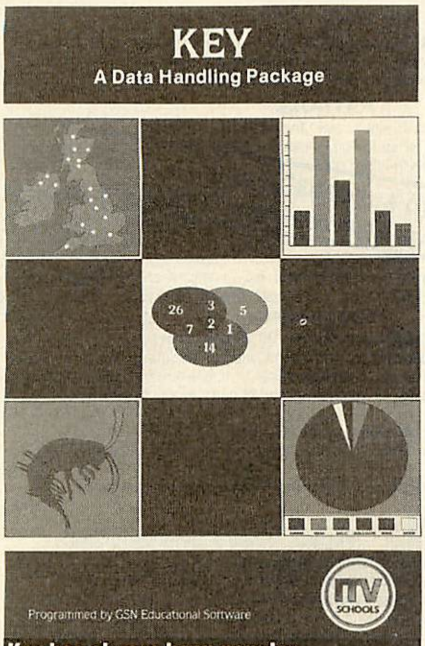
A computer program can never replace the concrete experience of learning and discovery in science.

I certainly would not recommend any software that tries to accomplish an activity that can and should be done with other materials.

Simulations, however, can play an important role in the science curriculum.

A number of popular Beeb simulations run with varying degrees of success on the A3000 upgraded with a Pres A3K6/12. For primary schools they include *Can You Find It?* and *Dinosaurs* (both Cambridge Software House), *Osprey!* (BES), *Pond Life* and *Seashore* (both Granada TV), *Whispy Wood* (Resource) and *Whale Facts* (Topologika). For secondary schools they include *Moving Molecules* and *Vegetation and Climate* (both Cambridge Micro Software). Unfortunately, almost all the science software (on 5.25in disc) I tested from Cambridge Micro Software, Heinneman and Longman failed to run.

Exemplifying all that is good in simulation software, *!Orrery* from Spacetech is



Key has always been popular

an ideal tool to help deliver AT16 at key stages 3 to 4. The model makes use of relative scaling, allowing visualisation of the solar system from any position within or without the solar system, including the geocentric view (from earth).

In the latter mode, stars and planets can be plotted, while seasonal changes and eclipses may be observed from any point on the earth's surface. Distances can be scaled to understandable dimensions and time can be accelerated to enable orbits like that of Pluto to be observed.

The solar system is projected onto a background that contains approximately 600 stars which can be optionally displayed as constellations.

!Orrery is packed with useful features but pupils will especially enjoy watching the behaviour of the planets (displayed as video digitised images taken from Voyager 1 and 2 material) as they orbit the sun.

The whole area of weather monitoring (including satellite reception) is too large to be included in detail here but for the moment, suffice to say that the Archimedes is an ideal computer for processing both the information and the images gathered from these sources.

At secondary level, datalogging, or the automatic recording of information at timed intervals, plays a significant part in the science orders.

A datalogger is an instrument which can take readings from a number of sensors and store them in its own memory.

In terms of the National Curriculum, a datalogger must be capable of being used both inside and outside the lab or classroom by people who do not necessarily have a high degree of expertise. Similarly, a datalogger must not tie up the classroom Arc for long periods.

Coupled with the powerful graphical features and processing speed of the Archimedes, dataloggers offer unprecedented ease in the collection, display and analysis of complex data.

The range of datalogging equipment is increasing rapidly with both qualitative and quantitative improvements being made.

Both LogIT and Sense and Control (Educational Electronics) are particularly recommended for Archimedes users. As each logger communicates serially with its host computer, an A3000 must be fitted with the £20 serial upgrade.

LogIT is a diminutive yet powerful and versatile logger. A LogIT starter pack comprises the datalogger, light level and temperature sensors packaged in a neat, plastic case.

It has a range of sockets for sensors, serial and ribbon cable connectors and an external power supply, while its controls simply comprise a green (start) and red (stop) push button, each with an LED.

To operate LogIT you simply install a PP3 battery, plug in a Microsense sensor, press the green button and that's it, logging begins. LogIT can record data in real time, displaying data graphically on the computer screen as it is logged. Events can be marked quite simply at the press of a button.

The Archimedes *Link Pack* software dis-



Sense and Control: recommended

plays data captured from LogIT's three modes of operation. It is menu driven, consistent, requires few key presses and has an excellent in-built help function always at hand. Zooming helps obtain a true picture of the captured data.

A LogIT version of the excellent NCET National Curriculum science support materials is also promised to support the logger. For ease of use and portability, LogIT is second to none.

Sense and Control is both a logger and a familiar control interface in one. It can be purchased in two ways: the interface and remote datalogger with a psu, connecting lead and two discs of software or with an optional datalogging pack including three temperature sensors, two light gates, a light probe, light switch and position sensor.

It is supported by comprehensive curriculum materials from NCET entitled *Practical Science with Microcomputers* which directly address specific National Curriculum attainment targets at key stages 3 to 4 (these materials are being published chapter by chapter as they are completed).

The datalogger has four inputs for analogue sensors and two for digital sensors. A BBC-style A-to-D port, user and printer ports, on-board Nicad batteries, a microprocessor and 8K of Ram give the unit a 'BBC micro' capability to which a variety external devices can be connected.

As far as A400 series and A3000 users are concerned, the Sense and Control unit is an ideal substitute for the respective I/O and User/Analogue podules.

A version of *Contact*(NCET) is already available that will permit a buffer box (for example a Deltronics or Barnet box) to be 'driven' via Sense and Control.

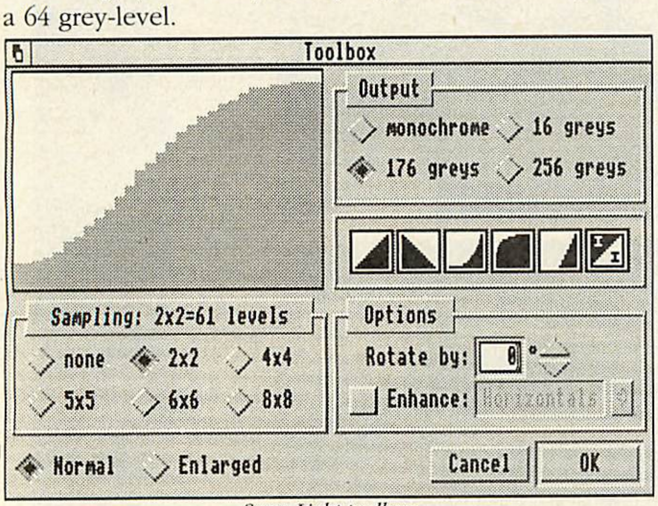
SUPPLIERS . . .

- ITV Schools, 6 Paul Street, London EC2A 4JH.
- The Advisory Unit, Endymion Road, Hatfield, Herts AL10 8AU.
- Spacetech, 21 West Wools, Portland, Dorset DT5 2EA.
- Griffin and George, Bishop Meadow Road, Loughborough, Leicestershire LE11 0RG.
- Educational Electronics, 28 Lake Street, Leighton Buzzard, Beds LU7 8RX.
- NCET, Sir William Lyons Road, Science Park, University of Warwick, Coventry CV4 7EZ.

SCAN LIGHT Plus

The latest generation Scan-Light Plus software provides a new easy to use and very powerful interface to the range of Scan-Light scanners and represents the most advanced software available for monochrome scanners on the Archimedes.

The main features of Scan-Light Plus centre around the scan toolbox. This controls the altered image view and allows the original scaled image to be sampled or anti-aliased in numerous different ways. This feature allows monochrome dithered scans to be turned into full grey-level sprites, ideal for incorporation into DTP or other programs. For example 4 by 4 sampling provides 16 grey-level images, while 8 by 8 sampling will turn an image into a 64 grey-level.



Scan-Light toolbox.

The grey-map allows precise and accurate control over these grey-levels. The grey-map cannot only lighten or darken the image but also invert it or, more usefully, compensate for any non-linearities in the original picture or the printer. The grey map provides direct control over the gamma correction curve. The toolbox also controls the number of greys in the output file - it's even possible to typeset images with 176 grey-levels suitable for photographic quality results.

Features include:

- Totally RISC OS compatible supporting in-memory transfer.
- Preview during scan to indicate progress.
- Two views of scanned image, original and altered.
- 61 grey-level screen display.
- Horizontal and vertical image flip.
- Prints either original or altered image, any scale, upright or sideways.
- Region select and crop to any rectangular portion of image.
- Original or altered image may be scaled by any amount.
- Original or altered sprite save.
- Sprite load facilities.
- A variety of altered image options;
  - 6 sampling options from 1 by 1 to 8 by 8 sampling.
  - Full control over brightness and contrast.
  - Full grey-map control.
  - Non-distorting image rotation in steps of one degree.
  - Image rotation 500 times faster than !Paint.
  - Additional image enhancement options such as edge detection.

All existing Scan-Light owners can obtain free upgrades.

Scan-Light Junior A3000 .... £189.00 + VAT
Scan-light Junior .... £189.00 + VAT
Scan-Light II A4 .... £399.00 + VAT
(Optional sheet feeder .... £100.00 + VAT
for A4 scanner)



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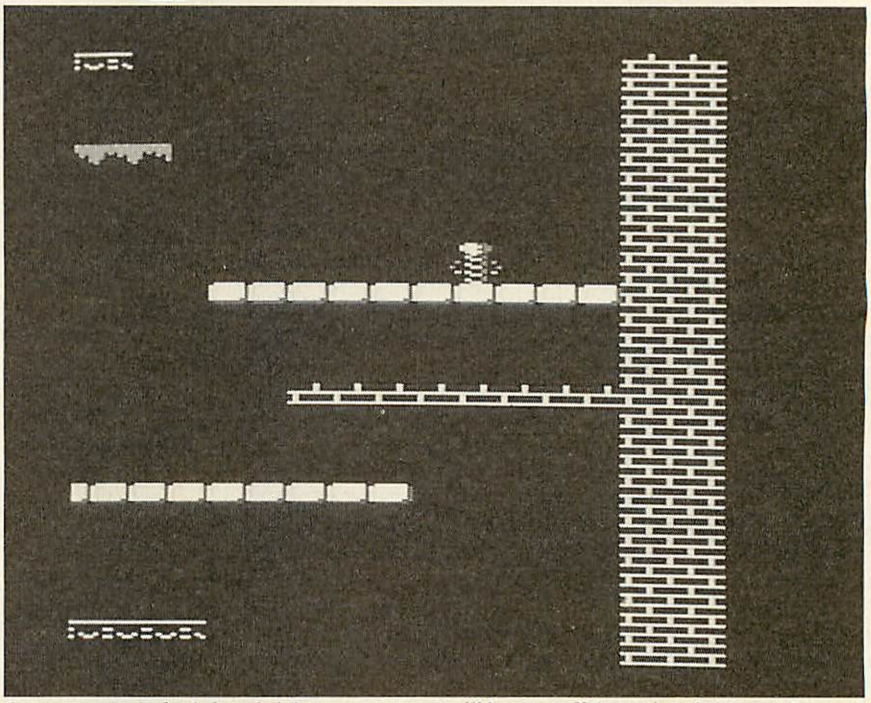
HATS OFF

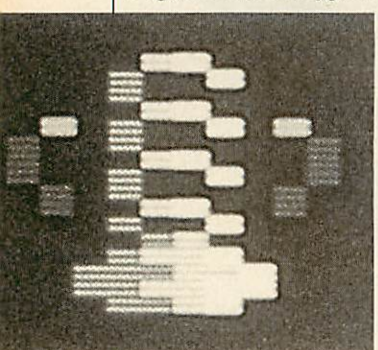
Get a head start in the New Year by using your Beeb to help save a planet in trouble. **BRYAN B CLOUD** transports you there

In a dimension not too distant from our own, on a planet called Pygmion live a race of small beings who have a problem. It is a very simple problem but unless someone can help them soon it will prove fatal. It seems that some very unstable Hyperspatial Antimatter Tachyons have pierced the space-time continuum and they have materialised in the Pygmoid's world. If left to their own devices, these 'Hats' will implode producing an effect rather similar to a large supernova exploding.

This wouldn't be too bad in the depths of space, but eight of 'em going off all at once in a building the size of St Paul's Cathedral could possibly have a small effect on the Pygmiod's way of life, not to mention their dimension.

However, all is not complete doom and gloom, a team of five research students at Pygmingham University have developed a Self Propelled, Rebounding, Indestructible Nullifying Gyroscope. The Hats can be neutralised by merely colliding into them with the 'Spring'. To make life a bit easier, a containment field has also been developed to keep the Hats stationary. The only problem now is that six Pygmoids are needed to control the Spring, the five developers are fully committed to manning (or do I mean Pygmoiding?) the various sub-systems of the Spring, as no-one else knows the subtle details of these systems – this leaves the post of 'Pilot' open to anyone. Luckily this is a relatively unskilled job only requiring the ability to operate the two controls for left and right movement of the Spring.





Who knows, perhaps the Pygmoids will find a gallant and courageous human willing to help them irradicate the Hats and save their very existence...

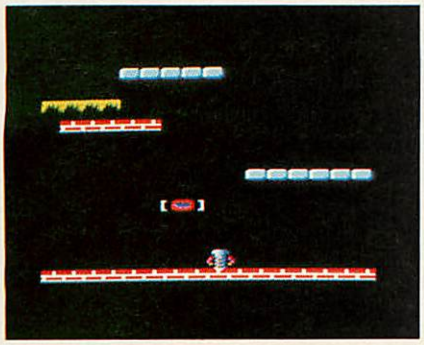
Playing the game

Playing *HatTrix* couldn't really be easier, you control the Spring with the Z and X keys. Holding down either of these keys starts a power meter (shown at the bottom of the screen) to rise. Releasing the key causes the Spring to jump. The longer you hold the key down, the higher the power meter rises and the further the Spring will jump. During a jump, the Spring will bounce off the various bricks, girders and ledges dotted about the playing area. When it lands, if its velocity is high enough, it will bounce again, only coming to a complete stop at very low speeds, so some care is needed in controlling its movement.

The Hats are randomly placed and are easily recognisable by their rather deceptively harmless appearance. (Note that this appearance means nothing to Pygmoids!) The containment fields can also be seen as pulsating energy bars.

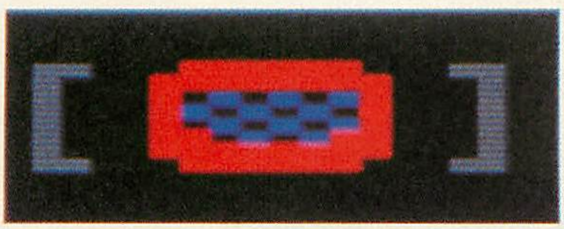
Typing in the game

You'll be pleased to know that there aren't thousands of lines of machine code to type in



before you can play *HatTrix*, instead there are just a couple of hundred lines of data! The reason for this is that the full game is not actually going to be revealed now, you'll have to wait until the concluding instalment next month for that. This is to show you how a game like this develops. More of this later.

To play the 'demo' version of *HatTrix*, type in listing 1 (called Create) on the yellow pages and save it somewhere. Running this program will decode the lines of data and create a file called *HatTrix*, you can run this by simply typing *HatTrix. As each data line is read, its number will be displayed, along with a checksum. At the end of the line this will be compared with a previously calculated value, if they don't match, an error will be flagged for that line.



Once the program has finished, if there are errors, carefully check the flagged lines, don't forget you might have the data correct, but the actual checksum wrong! All being well, the game file will be saved.

The development of HatTrix

First came a hard weekend of thinking of an idea. I wanted to write a game based loosely on the old Spectrum classic *Bugaboo*, obviously without treading too close to it and running into all sorts of copyright problems.

This boiled down to playing in an area much larger than the visible screen and scrolling around it. The choice of main character came relatively easily, I mean there aren't very many objects that bounce, and a spring had the possibility of coiling up prior to the initial leap. All that left to do was to work out a point to the game!

Having written the sprite plotting and screen scrolling routines, I found I had very little processor power left if I wanted to keep the game running at 50 frames a second (to maintain its smoothness).

Unfortunately this cut out the possibility of having other moving objects (hence the containment fields!), so I had to be happy with having static things.

I toyed with the idea of using the obvious awful pun and having stationery, ie, pens, paper, etc, but I gave up on that. In the end I settled for hats because I rather fancied the idea of a hat collector...

Once the structure of the game was settled, I set about adding to my rather basic scrolling and plotting routines. I added the bouncing, the power meter and the different platform types (originally there was only one).

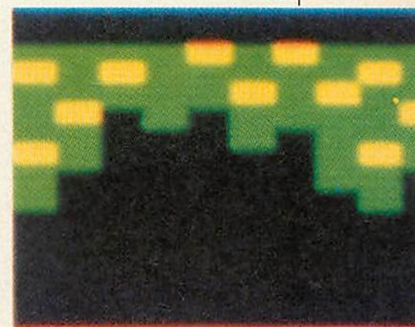
I won't go into how any of these routines work this time, you'll be able to see them in full next month.

Next came the hats, I decided to have eight different types of hat and have eight at the most in the playing area at any time. To start with, plotting them was relatively easy – I just extended the routine for checking platforms to check for hats as well.

Previously it only returned if there was a platform at a given position or not. Now it returns either a girder number (between one and four) or a hat number (between one and eight).

This means they are correctly drawn as they appear at the sides of the screen. At first I just treated hats as platforms, meaning you could either bounce off them or land on them. I then added the code to check for an actual collision between the spring and a hat and also for removing the hat from the screen.

This was one of the most tricky pieces of code in the game – working out where an object in a large playing area is actually displayed on the screen. Don't forget that the screen is hardware scrolled as well, so the top left-hand corner could be at any eight-byte boundary between &3000 and &8000!



Of course, the other piece of the game I developed was the silly scenario, but that was easy.

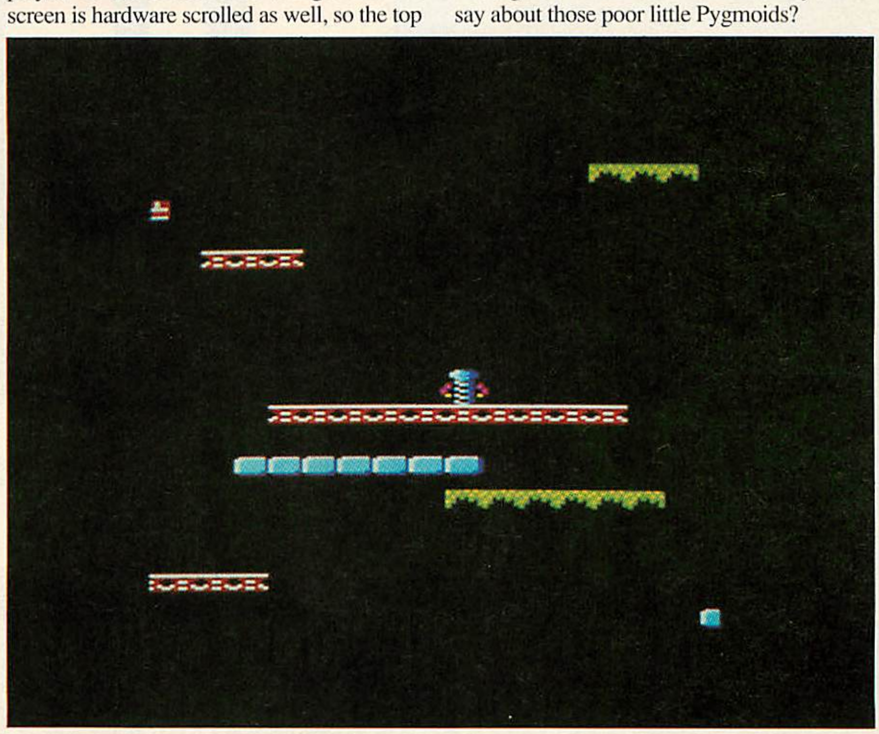
This is as far as the demo version of *HatTrix* goes at the moment. You can jump around some completely randomly placed platforms and you can collect the eight hats. Once you've got them all, you have to press ESCAPE and run the program again to have another go!

What's in store next month...

OK, you may be thinking this isn't much fun as it stands, well, I'd be inclined to agree with you. But I hope it does illustrate a 'middle' stage in the development of a largish game and may perhaps give you inspiration to write a game of your own and show you how to build up to the finished product in stages.

Note that there is nothing flashy yet, no title screen, highscore table, sound effects, nice graphics (these hats took me about two minutes each!), no quit game option, no scoring and in fact no real game as yet!

Next month, I'll be adding these features and maybe one or two more, the hats will reappear randomly once collected and you'll have a limited time to collect each one. The girders will also be stategically placed – there may even be a screen designer – who knows? The main improvement will be that it will turn into a game – remember what I initially had to say about those poor little Pygmoids?



Do you have a creative eye? Can you make the most of your Arc's ability to produce exciting images? If so, apply your skills and you can win a great prize – the new Taxan Multivision 795 colour monitor.

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- Originality of concept
- Skilled use of tools
- Visual impact

You can make use of any software package to produce the single fixed image (as opposed to animation). Only one image per person is permitted and each entry should be submitted on a 3.5in disc, labelled with your name and address and the title (where appropriate) of the image.

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To enter, send your disc to: Graphics Competition, *BBC Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Closing date is Monday January 21 1991.



COLOUR STYLE

Create some great colour graphics and win a Taxan Multivision monitor worth £500

COMPATIBILITY

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow Ram	Monthly Disc
Chords (1)		■	■	■	■	■		■	■	■	■	■
Risc Revue												
Listing 1-2							■					
Listing 3		■	■	■	■	■	■	■	■	■	■	■
Eight Bits												
Listing 1-4		■	■	■	■	■		■	■	■	■	■
Listing 5-6 (2)		■	■	■	■	■		■	■	■	■	■
Listing 7-9		■	■	■	■	■		■	■	■	■	■
Hat-Trix												
Listing 1		■	■	■	■			■	■	■	■	■
PicPac												
Listings 1-9 (3)		■	■	■	■	■		■	■	■	■	■

Note (1) Type exactly as shown, do not renumber.
(2) ADFS only
(3) ADFS only, requires last month's listings

MUSIC

Listing 1

```
   10 REM Chords
   20 REM Generate Chord shapes
   30 REM by Charles Williams
   40 REM for BBC B
   50 REM (c) BBC Acorn User January 1991
   60 :
   70 *FX 200,0
   80 *FX 15,1
   90 MODE 7
  100 CLEAR
  110 DIM at% 8
  120 e=0
  130 DIM e(12),A$(12),g(13),B$(13)
  140 FOR I%=1 TO 12
  150 READ e(I%),A$(I%)
  160 NEXT
  170 FOR I%=2 TO 3
  180 PRINTTAB(0,I%);CHR$(141);CHR$(132);CHR$(157);CHR$(131);TAB(14);"CHORD ROOT"
  190 NEXT
  200 FOR I%=1 TO 9
  210 PRINTTAB(15,I%+6);CHR$(131);I%;" ";A$(I%)
  220 NEXT
  230 FOR I%=10 TO 12
  240 PRINTTAB(14,I%+6);CHR$(131);I%;" ";A$(I%)
  250 NEXT
  260 PRINTTAB(14,19);CHR$(131);"13   END"
  270 PRINTTAB(1,23);CHR$(134);"Please enter number of your choice";
  280 REPEAT
  290 INPUT A
  300 A=INT(A)
  310 UNTIL A>0 AND A<14
  320 IF A=13 THEN END
  330 CLS
  340 FOR I%=1 TO 13
  350 READ g(I%),B$(I%)
  360 NEXT
  370 FOR I%=2 TO 3
  380 PRINTTAB(0,I%);CHR$(141);CHR$(132);CHR$(157);CHR$(131);TAB(15);"CHORD TYPE"
  390 NEXT
  400 FOR I%=1 TO 9
  410 PRINTTAB(15,5+I%);CHR$(131);I%;" ";A$(A)+B$(I%)
  420 NEXT
  430 FOR I%=10 TO 13
  440 PRINTTAB(14,5+I%);CHR$(131);I%;" ";A$(A)+B$(I%)
  450 NEXT
  460 PRINTTAB(1,23);CHR$(134);"Please enter number of your choice";
  470 REPEAT
  480 INPUT B
  490 B=INT(B)
  500 UNTIL B>0 AND B<14
  510 PROCa
  520 I%=1
  530 REPEAT
  540 MODE5
  550 VDU 19,0,4,0,0,0
  560 VDU 19,1,0,0,0,0
  570 VDU 23,8202;0;0;0;
  580 PROCb
  590 C$=A$(A)+B$(B)
  600 GCOL 0,1
  610 VDU 4
  620 PROCc(C$,2,2)
  630 VDU5
  640 PROCd(h(I%),768)
  650 PROCd(i(I%),704)
  660 PROCd(j(I%),640)
  670 PROCd(k(I%),576)
  680 PROCd(l(I%),512)
  690 PROCd(m(I%),448)
  700 PROCe
  710 REPEAT
  720 X$=GET$
  730 UNTIL INKEY(-82) OR INKEY(-69) OR INKEY(-86)
  740 IF INKEY(-82) THEN PROCf:GOTO710
  750 IF INKEY(-69) THEN I%=I%+1:IF I%=N%+1 THEN I%=1
  760 UNTIL INKEY(-86)
  770 GOTO 90
  780 END
  790 :
  800 DEF PROCa
  810 e=e(A)+g(B)
  820 RESTORE e
  830 READ N%
  840 DIM f(N%),h(N%),i(N%),j(N%),k(N%),l(N%),m(N%)
  850 FOR K%=1 TO N%
  860 READ f(K%),h(K%),i(K%),j(K%),k(K%),l(K%),m(K%)
  870 NEXT
  880 ENVELOPE 2,4,0,0,0,0,0,0,40,-4,0,-1,100,40
  890 VDU 23,224,24,60,126,255,255,126,60,24
  900 ENDPROC
  910 :
  920 DEF PROCc(E$,x,y)
  930 X%=at% MOD 256
  940 Y%=at% DIV 256
  950 A%=10
  960 D%=at%
  970 G$=CHR$(240)+CHR$8+CHR$10+CHR$(241)
  980 FOR N=1 TO LEN(E$)
  990 F$=MID$(E$,N,1)
 1000 ?D%=ASC(F$)
 1010 CALL &FFF1
 1020 VDU 23,240,D%?1,D%?1,D%?2,D%?2,D%?3,D%?3,D%?4,D%?4
 1030 VDU 23,241,D%?5,D%?5,D%?6,D%?6,D%?7,D%?7,D%?8,D%?8
 1040 PRINTTAB(x+N-1,y);G$
 1050 NEXT
 1060 ENDPROC
 1070 :
 1080 DEF PROCb
 1090 GCOL 0,3
 1100 MOVE 480,160
 1110 MOVE 800,160
 1120 PLOT 85,800,832
 1130 MOVE 480,832
 1140 PLOT 85,480,160
 1150 GCOL 0,1
 1160 FOR J%=480 TO 800 STEP 64
 1170 MOVE J%,160
 1180 DRAW J%,832
 1190 NEXT
 1200 FOR J%=192 TO 832 STEP 160
 1210 MOVE 480,J%
 1220 DRAW 800,J%
 1230 NEXT
 1240 IF f(I%)=0 THEN MOVE 480,816:DRAW 800,816:ENDPROC
 1250 MOVE -200,764
 1260 VDU 5
 1270 PRINT f(I%)
 1280 ENDPROC
 1290 :
 1300 DEF PROCd(Z%,X)
 1310 IF Z%=-1 THEN Y=864:MOVE X,Y:PRINT "X"
 1320 IF Z%=0 THEN Y=864:MOVE X,Y:PRINT"O"
 1330 IF Z%=1 THEN Y=768:MOVE X,Y:VDU 224
 1340 IF Z%=2 THEN Y=608:MOVE X,Y:VDU 224
 1350 IF Z%=3 THEN Y=448:MOVE X,Y:VDU 224
 1360 IF Z%=4 THEN Y=288:MOVE X,Y:VDU 224
 1370 ENDPROC
 1380 :
 1390 DEF PROCe
 1400 GCOL 0,2
 1410 MOVE 64,96
 1420 PRINT"Press S for SOUND"
 1430 MOVE 64,32
 1440 PRINT"Another form (Y/N)"
 1450 ENDPROC
 1460 :
 1470 DEF PROCf
 1480 PROCg(m(I%),-28)
 1490 PROCg(l(I%),-8)
 1500 PROCg(k(I%),12)
 1510 PROCg(j(I%),32)
 1520 PROCg(i(I%),48)
 1530 PROCg(h(I%),68)
 1540 ENDPROC
 1550 :
 1560 DEF PROCg(Z%,P%)
 1570 IF Z%=0 AND P%=-28 THEN SOUND1,0,160,10:SOUND0,-10,3,10:SOUND2,0,0,10:ENDPROC
 1580 IF Z%=0 AND P%=-8 THEN SOUND0,-10,3,10:SOUND1,0,181,10:SOUND2,0,0,10:ENDPROC
 1590 IF Z%=0 AND P%>0 THEN SOUND2,2,P%,10:SOUND2,0,0,1:ENDPROC
 1600 IF Z%=-1 THEN SOUND3,0,0,10:ENDPROC
 1610 IF f(I%)=0 THEN Z%=Z%+1
 1620 Q%=P%+(f(I%)*4)+((Z%-1)*4)
 1630 IF Q%=0 OR Q%>0 THEN SOUND2,2,Q%,10:SOUND2,0,0,1:ENDPROC
 1640 IF Q%=-24 THEN SOUND1,0,164,10:SOUND0,-10,3,10:SOUND2,0,0,10:ENDPROC
 1650 IF Q%=-20 THEN SOUND1,0,168,10:SOUND0,-10,3,10:SOUND2,0,0,10:ENDPROC
 1660 IF Q%=-16 THEN SOUND1,0,172,10:SOUND0,-10,3,10:SOUND2,0,0,10:ENDPROC
 1670 IF Q%=-12 THEN SOUND1,0,176,10:SOUND0,-10,3,10:SOUND2,0,0,10:ENDPROC
 1680 IF Q%=-8 THEN SOUND1,0,180,10:SOUND0,-10,3,10:SOUND2,0,0,10:ENDPROC
 1690 IF Q%=-4 THEN SOUND1,0,183,10:SOUND0,-10,3,10:SOUND2,0,0,10:ENDPROC
 1700 ENDPROC
 1710 :
 1720 DATA 1750,"A",2010,"Bb",2270,"B",2530,"C",2790,"C#",3050,"D",3310,"Eb",3570,"E",3830,"F",4090,"F#",4350,"G",4610,"Ab"
 1740 DATA 20," ",40,"6",60,"7",80,"9",100,"maj7",120,"maj9",140,"dim",160,"aug",180,"sus4",200,"m",220,"m6",240,"m7",260,"m9"
 1750 REM 1
 1760 DATA 4,0,0,2,2,2,0,0,5,1,1,2,3,3,1,7,3,4,3,1,1,0,9,1,2,1,3,4,-1
 1780 DATA 4,0,1,1,1,1,0,0,5,1,3,2,3,0,0,7,3,1,3,1,1,0,9,0,2,3,3,0,-1
 1800 DATA 5,0,3,2,2,2,0,0,0,0,2,0,2,0,-1,5,1,1,2,1,3,1,7,3,2,3,1,1,0,9,0,2,4,3,4,0
 1820 DATA 4,0,3,2,4,2,0,-1,4,2,2,1,2,0,-1,5,3,1,2,1,0,-1,6,2,3,1,2,0,-1
 1840 DATA 5,0,0,2,1,2,0,-1,0,4,2,2,2,0,-1,4,1,2,3,4,0,-1,5,1,1,2,2,3,1,9,1,1,1,3,4,4
 1860 DATA 5,0,0,0,1,2,0,-1,0,4,2,4,2,0,-1,4,1,2,1,3,1,2,7,1,3,3,1,1,3,11,0,2,3,1,2,-1
 1880 DATA 2,0,2,1,2,1,-1,-1,7,2,1,2,1,-1,-1
 1900 DATA 2,0,1,2,2,3,-1,-1,5,1,2,2,3,-1,-1
 1920 DATA 3,0,0,3,2,2,0,-1,5,1,1,3,3,3,1,7,4,4,3,1,0,-1
```

Continued ▶

MUSIC

◀ **Continued**

```
 1940 DATA 3,0,0,1,2,2,0,-1,5,1,1,1,3,3,
1,7,4,2,3,1,0,-1
 1960 DATA 4,0,2,1,2,2,0,-1,5,1,3,1,3,3,
1,7,2,1,3,1,0,-1,9,0,2,3,2,0,-1
 1980 DATA 4,0,0,1,0,2,0,-1,0,3,1,2,2,0,
-1,5,1,1,1,1,3,1,7,2,2,3,1,0,-1
 2000 DATA 5,0,0,0,0,2,0,-1,0,3,1,4,2,0,
-1,5,3,1,1,1,3,1,7,1,2,3,1,1,1,10,0,3,3,
1,3,-1
 2010 REM 2
 2020 DATA 4,0,1,3,3,3,1,1,6,1,1,2,3,3,1
,8,3,4,3,1,1,-1,10,1,2,1,3,4,-1
 2040 DATA 3,0,3,3,3,3,1,1,6,1,3,2,3,3,1
,8,3,1,3,1,-1,-1
 2060 DATA 3,0,1,3,1,3,1,1,6,1,1,2,1,3,1
,8,3,2,3,1,-1,-1
 2080 DATA 4,0,1,1,1,0,1,-1,5,-1,2,1,2,1
,-1,6,3,1,2,1,3,1,7,2,3,1,2,-1,-1
 2100 DATA 4,0,1,3,2,3,1,1,6,1,1,2,2,3,1
,8,3,3,3,1,1,-1,10,1,1,1,3,4,-1
 2120 DATA 4,0,1,1,2,0,1,-1,5,1,2,1,3,1,
2,5,1,2,1,4,-1,-1,8,1,3,3,1,1,3
 2140 DATA 3,0,0,2,0,2,1,0,0,3,2,3,2,-1,
-1,6,1,3,1,3,2,1
 2160 DATA 4,0,2,3,3,4,-1,-1,6,1,2,2,3,-
1,-1,7,4,1,1,2,3,-1,10,1,2,2,3,-1,-1
 2180 DATA 4,0,1,4,3,3,1,1,3,4,2,1,1,-1,
-1,6,1,1,3,3,3,1,8,4,4,3,1,1,-1
 2200 DATA 3,0,1,2,3,3,1,1,6,1,1,1,3,3,1
,8,2,4,3,1,1,-1
 2220 DATA 3,0,3,2,0,3,1,-1,6,1,3,1,3,3,
1,8,2,1,3,1,1,-1
 2240 DATA 3,0,1,2,1,3,1,1,6,1,1,1,1,3,1
,8,2,2,3,1,1,-1
 2260 DATA 3,0,1,1,1,3,1,1,6,3,1,1,1,3,1
,8,1,2,3,1,1,1
 2270 REM 3
 2280 DATA 3,0,2,4,4,4,2,2,7,1,1,2,3,3,1
,9,3,4,3,1,-1,-1
 2300 DATA 3,0,4,4,4,4,2,2,7,1,3,2,3,3,1
,9,3,1,3,1,1,-1
 2320 DATA 4,0,2,0,2,1,2,-1,0,2,4,2,4,2,
2,7,1,1,2,1,3,1,9,3,2,3,1,1,-1
 2340 DATA 4,0,2,2,2,1,2,-1,5,3,3,2,3,-1
,-1,7,3,1,2,1,3,1,8,2,3,1,2,0,-1
 2360 DATA 4,0,2,4,3,4,2,2,6,1,2,3,4,-1,
-1,7,1,1,2,2,3,1,9,3,3,3,1,1,-1
 2380 DATA 3,0,-1,2,3,1,2,-1,6,1,2,1,3,1
,2,9,1,3,3,1,1,3
 2400 DATA 3,0,1,3,1,3,2,1,0,4,3,4,3,-1,
-1,7,1,3,1,3,2,1
 2420 DATA 4,0,3,0,0,1,2,-1,3,1,2,2,3,-1
,-1,7,1,2,2,3,-1,-1,8,4,1,1,2,3,-1
 2440 DATA 4,2,1,4,3,3,1,1,4,4,2,1,1,-1,
-1,7,1,1,3,3,3,1,9,4,4,3,1,1,0
 2460 DATA 3,0,1,2,3,3,1,1,7,1,1,1,3,3,1
,9,2,4,3,1,1,-1
 2480 DATA 3,0,2,3,1,0,2,-1,7,1,3,1,3,3,
1,9,2,1,3,1,1,-1
 2500 DATA 4,0,2,0,2,0,2,2,0,1,2,1,3,1,1
,7,1,1,1,1,3,1,9,2,2,3,1,1,-1
 2520 DATA 3,0,2,2,2,0,2,-1,0,2,2,2,4,2,
2,7,3,1,1,1,3,1
 2530 REM 4
 2540 DATA 3,0,0,1,0,2,3,3,3,1,3,3,3,1,1
,8,1,1,2,3,3,1
 2560 DATA 5,0,0,1,2,2,3,0,3,3,3,3,3,1,-
1,5,1,1,1,1,3,1,7,2,2,3,1,1,-1,8,1,3,2,3
,-1,-1
 2580 DATA 3,0,0,1,3,2,3,0,3,1,3,1,3,1,1
,8,1,1,2,1,3,1
 2600 DATA 4,0,0,3,3,2,3,0,5,2,1,1,1,1,-
1,7,2,2,1,2,-1,-1,8,3,1,2,1,3,1
 2620 DATA 4,0,0,0,0,2,3,0,3,1,3,2,3,1,1
,7,1,2,3,4,-1,-1,8,1,1,2,2,3,1
 2640 DATA 4,0,0,3,4,2,3,0,5,3,1,3,1,-1,
-1,7,1,2,1,4,-1,-1,8,3,1,2,2,-1,-1
 2660 DATA 4,0,2,4,2,4,3,2,0,2,1,2,1,-1,
-1,6,2,1,2,1,-1,-1,8,1,3,1,3,2,1
 2680 DATA 3,0,-1,1,1,2,3,-1,4,1,2,2,3,-
1,-1,8,1,2,2,2,-1,-1
 2700 DATA 3,0,1,1,0,3,3,-1,3,1,4,3,3,1,
1,8,1,1,3,3,3,1
 2720 DATA 4,0,-1,1,0,1,3,3,3,1,2,3,3,1,
1,8,1,1,1,3,3,1,10,2,4,3,1,1,-1
 2740 DATA 3,0,3,1,2,1,3,-1,3,3,2,3,3,1,
1,8,1,3,1,3,3,1
 2760 DATA 3,0,3,1,3,1,3,-1,3,1,2,1,3,1,
1,8,1,1,1,1,3,1
 2780 DATA 3,0,3,3,3,1,3,-1,3,1,1,1,3,1,
1,8,3,1,1,1,3,1
 2790 REM 5
 2800 DATA 3,0,1,2,1,3,4,-1,4,1,3,3,3,1,
1,9,1,1,2,3,3,1
 2820 DATA 5,0,-1,2,3,3,4,-1,4,3,3,3,3,1
,1,6,1,1,1,1,3,1,8,2,2,3,1,1,-1,9,1,3,2,
3,-1,-1
 2840 DATA 3,0,-1,2,4,2,4,-1,4,1,3,1,3,1
,1,9,1,1,2,1,3,1
 2860 DATA 4,0,4,4,4,3,4,-1,6,2,1,1,1,1,
-1,8,2,2,1,2,-1,-1,9,3,1,2,1,3,1
 2880 DATA 4,0,1,1,1,3,4,1,4,1,3,2,3,1,1
,8,1,2,3,4,-1,-1,9,1,1,2,2,3,1
 2900 DATA 4,3,-1,2,3,1,2,-1,6,3,1,3,1,-
1,-1,8,1,2,1,4,-1,-1,9,3,1,2,2,-1,-1
 2920 DATA 3,0,3,2,3,2,-1,-1,3,1,3,1,3,2
,1,9,1,3,1,3,2,1
 2940 DATA 3,0,1,2,2,3,-1,-1,5,1,2,2,3,-
1,-1,9,1,2,2,3,-1,-1
 2960 DATA 3,4,1,4,3,3,1,1,6,4,2,1,1,-1,
-1,9,1,1,3,3,1,1
 2980 DATA 3,0,0,2,1,2,-1,-1,4,1,2,3,3,1
,1,9,1,1,1,3,3,1
 3000 DATA 4,0,4,2,3,2,4,0,4,3,2,3,3,1,1
,6,1,4,1,3,2,1,9,1,3,1,3,3,1
 3020 DATA 3,0,4,2,4,2,4,0,4,1,2,1,3,1,1
,9,1,1,1,1,3,1
 3040 DATA 3,0,4,4,4,2,4,0,4,1,1,1,3,1,1
,9,3,1,1,1,3,1
 3050 REM 6
 3060 DATA 4,0,2,3,2,0,0,-1,2,1,2,1,3,4,
-1,5,1,3,3,3,1,1,10,1,1,2,3,3,1
 3080 DATA 3,0,2,0,2,0,0,-1,5,3,3,3,3,1,
1,7,1,1,1,1,3,1
 3100 DATA 3,0,2,1,2,0,0,-1,3,-1,1,3,2,3
,-1,5,1,3,1,3,1,1
 3120 DATA 4,0,0,1,2,3,0,-1,4,2,2,2,1,2,
-1,7,2,1,1,1,1,-1,9,0,2,1,2,1,-1
 3140 DATA 3,0,2,2,2,0,0,-1,5,1,3,2,3,1,
1,9,1,2,3,4,-1,-1
 3160 DATA 4,0,0,2,2,4,0,-1,4,-1,2,3,1,2
,-1,7,3,1,1,1,1,-1,9,1,2,1,4,0,-1
 3180 DATA 3,0,1,0,1,0,-1,-1,4,1,3,1,3,2
,1,6,2,1,2,1,-1,-1
 3200 DATA 3,0,2,3,3,4,-1,-1,3,4,1,1,2,3
,-1,6,1,2,2,3,-1,-1
 3220 DATA 3,0,3,3,2,0,0,-1,5,1,4,3,3,1,
1,10,1,1,3,3,1,1
 3240 DATA 3,0,1,3,2,0,0,-1,5,1,2,3,3,1,
1,10,1,1,1,3,3,1
 3260 DATA 4,0,1,0,2,0,0,-1,3,3,1,2,1,3,
-1,5,3,2,3,3,1,1,10,1,3,1,3,3,1
 3280 DATA 4,0,1,1,2,0,0,-1,3,3,1,3,1,3,
-1,5,1,2,1,3,1,1,10,1,4,1,1,3,1
 3300 DATA 4,0,0,1,2,3,0,-1,3,3,3,3,1,3,
3,5,1,1,1,3,1,1,10,3,1,1,1,3,1
 3310 REM 7
 3320 DATA 4,3,1,2,1,3,4,-1,6,1,3,3,3,1,
1,8,4,1,1,1,3,4,11,1,1,2,3,3,1
 3340 DATA 4,3,1,2,1,3,1,1,4,-1,1,2,2,3,
-1,6,3,3,3,3,1,1,8,1,4,1,3,3,1
 3360 DATA 3,0,3,2,3,1,1,-1,4,-1,1,3,2,3
,-1,6,1,3,1,3,1,1
 3380 DATA 4,0,1,2,0,1,1,-1,5,2,2,2,1,2,
-1,8,2,1,1,1,1,-1,10,2,2,1,2,-1,-1
 3400 DATA 4,0,3,3,3,1,1,-1,3,1,1,1,3,4,
-1,6,1,3,2,3,1,1,10,1,2,3,4,-1,-1
 3420 DATA 4,0,1,3,0,1,-1,-1,5,-1,2,3,1,
2,-1,8,3,1,1,1,1,-1,10,1,2,1,4,-1,-1
 3440 DATA 3,0,2,1,2,1,-1,-1,4,2,1,2,1,-
1,-1,5,1,3,1,3,2,1
 3460 DATA 4,0,3,0,0,1,2,3,3,1,2,2,3,-1,
-1,4,4,1,1,2,3,-1,7,1,2,2,3,-1,-1
 3480 DATA 3,0,4,4,3,1,1,-1,6,1,4,3,3,1,
1,11,1,1,3,3,1,1
 3500 DATA 3,0,2,4,3,4,-1,-1,0,2,4,3,1,1
,-1,6,1,2,3,3,1,1
 3520 DATA 3,0,2,1,3,1,1,-1,4,3,1,2,1,3,
-1,6,3,2,3,3,1,1
 3540 DATA 3,0,2,2,3,1,1,-1,6,1,2,1,3,1,
1,11,1,1,1,1,3,1
 3560 DATA 3,0,1,2,3,1,1,-1,4,3,3,3,1,3,
-1,6,1,1,1,3,1,1
 3570 REM 8
 3580 DATA 4,0,0,0,1,2,2,0,2,3,4,3,1,1,0
,4,1,2,1,3,4,0,7,1,3,3,3,1,0
 3600 DATA 4,0,0,2,1,2,2,0,0,4,2,4,2,2,0
,5,0,1,2,2,3,0,7,3,3,3,3,1,1
 3620 DATA 4,0,0,3,1,2,2,0,0,4,3,4,2,2,0
,5,0,1,3,2,3,0,7,1,3,1,3,1,1
 3640 DATA 4,0,2,0,1,0,2,0,0,4,3,4,4,2,0
,6,0,2,2,1,2,0,7,0,3,1,3,3,0
 3660 DATA 4,0,0,3,0,0,2,0,0,4,4,4,2,2,0
,4,1,1,1,3,4,0,7,1,3,2,3,1,1
 3680 DATA 5,0,2,0,1,1,2,0,0,2,4,4,2,2,0
 4,1,1,1,4,0,6,0,2,3,1,2,0,9,3,1,1,1,1
,0
 3700 DATA 3,0,0,2,0,2,1,0,0,3,2,3,2,-1,
-1,6,1,3,1,3,2,1
 3720 DATA 3,0,0,1,1,2,-1,-1,0,4,1,1,2,3
,0,5,4,1,1,2,3,0
 3740 DATA 4,0,0,0,2,2,2,0,2,4,4,3,1,1,0
,4,0,2,1,4,4,0,7,1,4,3,3,1,1
 3760 DATA 4,0,0,0,0,2,2,0,2,2,4,3,1,1,0
,3,1,3,2,3,-1,-1,7,1,2,3,3,1,1
 3780 DATA 3,0,0,2,0,2,2,0,0,3,2,4,2,2,0
,7,3,2,3,3,1,1
 3800 DATA 4,0,0,3,0,2,2,0,0,3,3,4,2,2,0
,3,0,1,2,3,-1,-1,7,1,2,1,3,1,1
 3820 DATA 5,0,2,3,0,2,2,0,0,2,3,4,2,2,0
,5,0,3,3,1,3,0,7,1,1,1,3,1,1,10,0,3,2,3,
1,0
 3830 REM 9
 3840 DATA 4,0,1,1,2,3,3,1,3,3,4,3,1,1,-
1,5,1,2,1,3,4,0,8,1,3,3,3,1,1
 3860 DATA 3,0,1,3,2,3,-1,-1,3,3,1,3,1,1
,-1,8,3,3,3,3,1,1
 3880 DATA 3,0,1,1,2,1,3,1,3,3,2,3,1,1,-
1,8,1,3,1,3,1,1
 3900 DATA 4,0,1,1,0,1,0,1,0,3,4,2,3,0,-
1,3,1,2,3,1,-1,-1,7,2,2,2,1,2,-1
 3920 DATA 4,0,0,1,2,3,-1,-1,0,1,1,2,2,3
,1,5,1,1,1,3,4,0,8,1,3,2,3,1,1
 3940 DATA 3,0,0,1,0,2,0,1,3,1,3,3,1,0,-
1,5,1,1,1,1,4,1
 3960 DATA 3,0,1,3,1,3,2,1,0,4,3,4,3,-1,
-1,4,1,3,1,3,2,1
 3980 DATA 5,0,1,2,2,3,-1,-1,2,4,1,1,2,3
,-1,5,1,2,2,3,-1,-1,6,4,1,1,2,3,-1,9,1,2
,2,3,-1,-1
 4000 DATA 3,0,1,1,3,3,3,1,3,4,4,3,1,1,-
1,8,1,4,3,3,1,1
 4020 DATA 3,0,1,1,1,3,3,1,3,2,4,3,1,1,-
1,8,1,2,3,3,1,1
 4040 DATA 3,0,1,3,1,3,3,1,3,2,1,3,1,1,-
1,8,3,2,3,3,1,1
 4060 DATA 3,0,1,1,1,1,3,1,3,2,2,3,1,1,-
1,8,1,2,1,3,1,1
 4080 DATA 3,0,3,1,1,1,3,1,3,1,2,3,4,-1,
-1,6,3,3,3,1,3,-1
 4090 REM 10
 4100 DATA 4,0,2,2,3,4,4,1,4,3,4,3,1,1,-
1,6,1,2,1,3,4,1,9,1,3,3,3,1,1
 4120 DATA 3,0,2,4,3,4,-1,-1,4,3,1,3,1,1
,-1,9,3,3,3,3,1,1
 4140 DATA 3,0,2,2,3,2,4,2,4,3,2,3,1,1,-
1,9,1,3,1,3,1,1
 4160 DATA 5,0,2,2,1,2,-1,-1,0,4,2,3,2,4
,2,3,2,3,1,2,-1,-1,4,1,2,3,1,-1,-1,8,2,2
,2,1,2,0
 4180 DATA 4,0,1,2,3,4,-1,-1,4,3,3,3,1,1
,-1,6,1,1,1,3,4,1,9,1,3,2,3,1,1
 4200 DATA 4,0,1,2,1,4,-1,-1,0,1,2,1,3,1
,2,4,1,3,3,1,1,3,6,1,1,1,1,4,1
 4220 DATA 3,0,2,4,2,4,3,2,4,2,1,2,1,-1,
-1,8,1,3,1,3,2,1
 4240 DATA 3,0,2,3,3,4,-1,-1,3,4,1,1,2,3
,-1,7,4,1,1,2,3,-1
 4260 DATA 3,0,2,2,4,4,4,2,4,4,4,3,1,1,-
1,9,1,4,3,3,1,1
 4280 DATA 3,0,2,2,2,4,4,2,4,2,4,3,1,1,-
1,9,1,2,3,3,1,1
 4300 DATA 3,0,2,4,2,4,4,2,4,2,1,3,1,1,-
1,9,3,2,3,3,1,1
 4320 DATA 3,0,2,2,2,2,4,2,4,2,2,3,1,1,0
,9,1,2,1,3,1,1
 4340 DATA 5,0,4,2,2,2,4,2,2,3,4,1,3,-1,
-1,4,1,2,3,1,1,1,7,3,3,3,1,3,3,9,1,1,1,3
,1,1
 4350 REM 11
 4360 DATA 4,0,3,0,0,0,2,3,3,1,1,2,3,3,1
,5,3,4,3,1,1,-1,7,1,2,1,3,4,-1
 4380 DATA 4,0,0,0,0,0,2,3,3,1,3,2,3,-1,
-1,3,0,1,2,3,3,-1,5,3,1,3,1,1,0
 4400 DATA 3,0,1,0,0,0,2,3,3,1,1,2,1,3,1
,5,3,2,3,1,1,-1
 4420 DATA 5,0,1,0,2,0,2,3,0,3,3,2,3,-1,
-1,3,3,1,2,1,3,1,4,2,3,1,2,0,-1,9,2,2,2,
1,2,2
 4440 DATA 5,0,2,0,0,0,2,3,2,1,2,3,4,-1,
-1,3,1,1,2,2,3,1,5,3,3,3,1,1,-1,7,1,1,1,
3,4,4
 4460 DATA 3,0,2,3,2,4,2,3,3,3,1,2,2,-1,
-1,5,1,3,3,1,1,3
 4480 DATA 3,3,1,3,1,3,2,1,5,2,1,2,1,-1,
-1,9,1,3,1,3,2,1
 4500 DATA 3,0,3,0,0,1,2,3,3,1,2,2,3,-1,
-1,4,4,1,1,2,3,-1
 4520 DATA 3,3,1,1,3,3,3,1,5,4,4,3,1,1,-
1,10,1,4,3,3,1,1
 4540 DATA 3,3,1,1,1,3,3,1,5,2,4,3,1,1,-
1,10,1,2,3,3,1,1
 4560 DATA 3,3,1,3,1,3,3,1,5,2,1,3,1,1,-
1,10,3,2,3,3,1,1
 4580 DATA 3,3,1,1,1,1,3,1,5,2,2,3,1,1,-
1,10,1,2,1,3,1,1
 4600 DATA 4,3,3,1,1,1,3,1,5,1,2,3,1,1,1
,8,3,3,3,1,3,3,10,1,1,1,3,1,1
 4610 REM 12
 4620 DATA 4,0,4,1,1,1,-1,-1,4,1,1,2,3,3
,1,6,3,4,3,1,1,-1,8,1,2,1,3,4,1
 4640 DATA 4,0,1,1,1,1,-1,-1,4,1,3,2,3,-
1,-1,4,1,3,2,3,3,1,6,3,1,3,1,1,-1
 4660 DATA 4,0,2,1,1,1,-1,-1,4,1,1,2,1,3
,1,6,3,2,3,1,1,-1,11,1,3,1,3,1,1
 4680 DATA 4,0,4,4,3,4,-1,-1,4,3,1,2,1,3
,1,5,2,3,1,2,-1,-1,10,2,2,2,1,2,-1
 4700 DATA 4,3,1,2,3,4,-1,-1,4,1,1,2,2,3
,1,6,3,3,3,1,1,-1,8,1,1,1,3,4,1
 4720 DATA 3,3,1,2,1,3,1,2,4,3,1,2,2,-1,
-1,6,1,3,3,1,1,3
 4740 DATA 3,4,1,3,1,3,2,1,6,2,1,2,1,-1,
-1,10,1,3,1,3,2,1
 4760 DATA 3,0,0,1,1,2,-1,-1,4,1,2,2,3,-
1,-1,5,4,1,1,2,3,0
 4780 DATA 3,0,4,2,1,1,-1,-1,4,1,1,3,3,3
,1,6,4,4,3,1,1,-1
 4800 DATA 4,0,4,4,1,1,2,-1,4,1,1,1,3,3,
1,6,2,4,3,1,1,-1,11,1,2,3,3,1,1
 4820 DATA 4,0,1,0,1,1,-1,-1,0,1,4,1,1,2
,1,4,1,3,1,3,3,1,6,2,1,3,1,1,-1
 4840 DATA 3,0,2,0,1,1,2,-1,4,1,1,1,1,3,
1,6,2,2,3,1,1,-1
 4860 DATA 4,4,3,1,1,1,3,1,4,3,4,1,3,-1,
-1,6,1,2,3,1,1,1,9,3,3,3,1,3,-1
```

RISC REVUE

Listing 1

```
   10 REM >Fractals (RR1)
   20 REM by Andrew Jones & Shane Hope
   30 REM for Archimedes only
   40 REM (c) BAU January 1991
   50 :
   60 DIM matrix%(256,256)
   70 filename$="FractalTst"
   80 :
   90 REPEAT
  100 MODE 12
  110 REPEAT
  120 PRINT"How many iterations? (1-8):"
;
  130 INPUT""iterations%
  140 UNTIL iterations%>0 AND iterations
%<9
  150 CLS
  160 REPEAT
  170 PRINT"Which landscape? (0=rockies,
1=rain forest): ";
  180 INPUT""landscape%
  190 UNTIL landscape%=0 OR landscape%=1
  200 CLS
  210 OFF
  220 :
  230 ORIGIN 0,900
  240 COLOUR &00,&60,&60,&60
  250 VDU 19,0,24,&60,&60,&60
  260 COLOUR &01,&F0,&F0,&F0
  270 COLOUR &02,&30,&80,&F0
  280 IF landscape%=0 THEN
  290 COLOUR &05,&00,&40,&E0
  300 ELSE
  310 COLOUR &05,&00,&B0,&A0
  320 ENDIF
  330 :
  340 REPEAT
  350 matrix%()=0
  360 matrixwidth%=256
  370 hratio=1.4
  380 height%=135
  390 under%=210
  400 sea%=0
  410 matrix%(0,256)=0
  420 matrix%(0,0)=0
  430 matrix%(256,0)=0
  440 matrix%(128,0)=0
  450 matrix%(0,128)=0
  460 matrix%(128,128)=0
  470 matrix%(40,200)=40
  480 :
  490 lratio1=1
  500 lratio2=0
  510 lratio3=1
  520 length=SQR(lratio1*lratio1+lratio2
*lratio2+lratio3*lratio3)
  530 lratio1=lratio1/length
  540 lratio2=lratio2/length
  550 lratio3=lratio3/length
  560 colour%=&30
  570 :
  580 FOR loop%=6 TO 15
  590 IF landscape%=0 THEN
  600 COLOUR loop%,colour%,colour%,&40
  610 ELSE
  620 COLOUR loop%,0,colour%,&50
  630 ENDIF
  640 colour%+=&0F
  650 NEXT loop%
  660 :
  670 FOR loopi%=1 TO iterations%
  680 COLOUR 1
```

Continued ▶

RISC REVUE

◀ **Continued**

```
690 PRINTTAB(0,0)"Pass : ";
700 COLOUR 2
710 PRINT loopi%
720 PROCdoppler
730 matrixwidth%=matrixwidth%/2
740 NEXT
750 :
760 CLS
770 PROCdrawfractal
780 COLOUR 1
790 PRINTTAB(0,0)"Save fractal (Y/N)"
800 key=GET
810 IF key=89 OR key=121 THEN PRINTTAB(0,0);STRING$(50,CHR$32):OSCLI"SCREENSAVE "+filename$
820 CLS
830 PRINT"New fractal (Y/N)"
840 key=GET
850 UNTIL key<>89 AND key<>121
860 UNTIL FALSE
870 END
880 :
890 DEF PROCdrawfractal
900 swidth=4.92*matrixwidth%
910 sheight=0.866*swidth
920 sratio3=swidth*sheight
930 sratiosquared=sratio3*sratio3
940 FOR loopy%=0 TO 255 STEP matrixwidth%
950 aoffset%=loopy%/2
960 boffset%=aoffset%+matrixwidth%
970 coffset%=(loopy%+matrixwidth%)/2
980 doffset%=coffset%+matrixwidth%
990 triwidth=(loopy%+matrixwidth%)*hratio+under%-height%
1000 triheight=loopy%*hratio+under%-height%
1010 :
1020 FOR loopx%=0 TO 255-loopy%-matrixwidth% STEP matrixwidth%
1030 height1%=matrix%(loopx%,loopy%+matrixwidth%)/10
1040 :
1050 IF height1%<sea% THEN height1%=sea%
1060 height2%=matrix%(loopx%+matrixwidth%,loopy%)/10
1070 :
1080 IF height2%<sea% THEN height2%=sea%
1090 height3%=matrix%(loopx%+matrixwidth%,loopy%+matrixwidth%)/10
1100 :
1110 IF height3%<sea% THEN height3%=sea%
1120 sratio1=-sheight*(height3%-height1%)
1130 sratio2=swidth*((height1%+height3%)/2-height2%)
1140 length=SQR(sratio1*sratio1+sratio2*sratio2+sratiosquared)
1150 colour%=INT(((lratio1*sratio1+lratio2*sratio2+lratio3*sratio3)/length)*9+6)
1160 IF colour%<6 THEN colour%=6
1170 :
1180 IF height3%<=sea% AND height2%<=sea% AND height1%<=sea% THEN colour%=5
1190 :
1200 GCOL colour%
1210 MOVE (loopx%+coffset%)*4.92,-(triwidth-height1%)*2
1220 MOVE (loopx%+boffset%)*4.92,-(triheight-height2%)*2
1230 PLOT 85,(loopx%+doffset%)*4.92,-(triwidth-height3%)*2
1240 NEXT
1250 :
1260 FOR loopx%=0 TO 255-loopy% STEP matrixwidth%
1270 height1%=matrix%(loopx%,loopy%)/10
1280 :
1290 IF height1%<sea% THEN height1%=sea%
1300 height2%=matrix%(loopx%,loopy%+matrixwidth%)/10
1310 :
1320 IF height2%<sea% THEN height2%=sea%
1330 height3%=matrix%(loopx%+matrixwidth%,loopy%)/10
1340 :
1350 IF height3%<sea% THEN height3%=sea%
1360 sratio1=-sheight*(height3%-height1%)
1370 sratio2=swidth*((height1%+height3%)/2-height2%)
1380 length=SQR(sratio1*sratio1+sratio2*sratio2+sratiosquared)
1390 colour%=INT(((lratio1*sratio1+lratio2*sratio2+lratio3*sratio3)/length)*9+6)
1400 IF colour%<6 THEN colour%=6
1410 IF height3%<=sea% AND height2%<=sea% AND height1%<=sea% THEN colour%=5
1420 GCOL colour%
1430 MOVE (loopx%+aoffset%)*4.92,-(triheight-height1%)*2
1440 MOVE (loopx%+boffset%)*4.92,-(triheight-height3%)*2
1450 PLOT 85,(loopx%+coffset%)*4.92,-(triwidth-height2%)*2
1460 NEXT
1470 NEXT
1480 ENDPROC
1490 :
1500 DEF PROCdoppler
1510 heightoffset%=matrixwidth%*10
1520 tempwidth%=matrixwidth%/2
1530 :
1540 FOR loopy%=0 TO 255 STEP matrixwidth%
1550 FOR loopx%=0 TO 255-loopy% STEP matrixwidth%
1560 boffset%=(matrix%(loopx%,loopy%)+matrix%(loopx%+matrixwidth%,loopy%))/2
1570 matrix%(loopx%+tempwidth%,loopy%)=matrix%(loopx%+tempwidth%,loopy%)+boffset%+(RND(1)-0.5)*heightoffset%
1580 :
1590 boffset%=(matrix%(loopy%,loopx%)+matrix%(loopy%,loopx%+matrixwidth%))/2
1600 :
1610 matrix%(loopy%,loopx%+tempwidth%)=matrix%(loopy%,loopx%+tempwidth%)+boffset%+(RND(1)-0.5)*heightoffset%
1620 :
1630 boffset%=(matrix%(256-loopy%-loopx%,loopx%)+matrix%(256-loopy%-loopx%-matrixwidth%,loopx%+matrixwidth%))/2
1640 :
1650 matrix%(256-loopy%-loopx%-tempwidth%,loopx%+tempwidth%)=matrix%(256-loopy%-loopx%-tempwidth%,loopx%+tempwidth%)+boffset%+(RND(1)-0.5)*heightoffset%
1660 :
1670 NEXT
1680 NEXT
1690 ENDPROC
```

Listing 2

```
10 REM >!RunImage (RR2)
20 REM Desktop Anti-Exit program
30 REM by Tim Gladding
40 REM (c) BAU January 1991
50 :
60 DIM block% 1023
70 quit%=FALSE
80 $block%="TASK"
90 SYS "Wimp_Initialise",200,!block%,"Anti-Exit"
100 ON ERROR PROCerror(REPORT$)
110 :
120 REPEAT
130 SYS "Wimp_Poll",1,block% TO reason%
140 CASE reason% OF
150 WHEN 17,18:PROCmessage(block%!16)
160 ENDCASE
170 IF quit% PROCclosedown
180 UNTIL FALSE
190 :
200 DEF PROCmessage(mess%)
210 CASE mess% OF
220 WHEN 0:PROCclosedown
230 WHEN 8:IF NOT FNask("Exit - are you sure?"):PROCack(8)
240 ENDCASE
250 ENDPROC
260 :
270 DEF PROCclosedown
280 SYS "Wimp_CloseDown"
290 END
300 :
310 DEF PROCerror(err$)
320 SYS "Hourglass_Smash"
330 IF NOT FNask(err$) quit%=TRUE
340 ENDPROC
350 :
360 DEF FNask(A$)
370 SYS "Wimp_ReportError","****"+A$,&17,"Message from Anti-Exit" TO ,ans
380 =(ans=1)
390 :
400 DEF PROCack(mess%)
410 block%!12=block%!8
420 block%!16=mess%
430 SYS "Wimp_SendMessage",17,block%,block%!4
440 ENDPROC
```

Listing 3

```
10 REM >Euler (RR3)
20 REM by P S Williams
30 REM for A/B/B+/M/C/E
40 REM (c) BAU January 1991
50 :
60 INPUT"Number of terms ",N%
70 s=0
80 FOR I%=1 TO N%+1
90 s=s+LN(I%)
100 NEXT
110 D%=INT((s-1-LN(2))/LN(10))
120 PRINT"Results are accurate to ";D%;" places"
130 DIM a%(N%)
140 PRINT" e=2.";
150 FOR I%=2 TO N%
160 a%(I%)=10
170 NEXT
180 FOR I%=1 TO D%
190 a%(1)=0
200 FOR J%=N% TO 2 STEP -1
210 Q%=a%(J%) DIV J%
220 R%=a%(J%) MOD J%
230 a%(J%)=10*R%
240 a%(J%-1)=a%(J%-1)+Q%
250 NEXT
260 PRINT STR$(a%(1));
270 NEXT
280 PRINT
290 END
```

EIGHT BITS

Listing 1

```
10 REM GaskSrc (EB1)
20 REM by Andrew Pepperell
30 REM for B/B+/M/C/E
40 REM (c) BAU Jan 91
50 :
60 PROCassemble
70 PROCsavecode
80 END
90 :
100 DEF PROCsavecode
110 name$="GCode"
120 OSCLI("SAVE "+name$+" "+STR$~start+" "+STR$~P%)
130 ENDPROC
140 :
150 DEF PROCassemble
160 randreg=&70
170 eorwith=&74
180 xco=&77
190 yco=&79
200 plotto=&7C
210 oldevntv=&A8
220 flag=&AA
230 address=&AC
240 tempaddr=&AE
250 coords=&404
260 start=&900
270 oswrch=&FFEE
280 osbyte=&FFF4
290 :
300 !randreg=RND
310 :
320 FOR pass=0 TO 3 STEP 3
330 P%=start
340 [
350 OPT pass
360 LDA &220
370 STA oldevntv
380 LDA &221
390 STA oldevntv+1
400 LDA #char MOD 256
410 STA &220
420 LDA #char DIV 256
430 STA &221
440 LDA #14
450 LDX #2
460 JSR osbyte
470 LDA #22
480 JSR oswrch
490 LDA #0
500 STA flag
510 JSR oswrch
520 LDA #randreg?0
530 STA randreg
540 LDA #randreg?1
550 STA randreg+1
560 LDA #randreg?2
570 STA randreg+2
580 LDA #randreg?3
590 STA randreg+3
600 LDA #&53
610 STA eorwith
620 LDA #&B5
630 STA eorwith+1
640 LDA #&76
650 STA eorwith+2
660 LDA coords
670 STA xco
680 LDA coords+1
690 STA xco+1
700 LDA coords+4
710 STA yco
720 LDA coords+5
730 STA yco+1
740 :
750 .mainloop
760 LDY #2
770 :
780 .startrand
790 CLC
800 LDA randreg+3
810 BPL zerobit
820 LDX #2
830 :
840 .randloop
850 LDA randreg,X
860 EOR eorwith,X
870 STA randreg,X
880 DEX
890 BPL randloop
900 SEC
910 :
920 .zerobit
930 ROL randreg
940 ROL randreg+1
950 ROL randreg+2
960 ROL randreg+3
970 DEY
980 BNE startrand
990 LDA randreg+3
1000 AND #3
1010 CMP #3
1020 BEQ mainloop
1030 ASL A
1040 ASL A
1050 ASL A
1060 TAX
1070 LDA coords,X
1080 SEC
1090 SBC xco
1100 STA plotto
1110 INX
1120 LDA coords,X
1130 SBC xco+1
1140 STA plotto+1
1150 INX:INX:INX
1160 LDA coords,X
1170 SEC
1180 SBC yco
1190 STA plotto+2
1200 INX
1210 LDA coords,X
1220 SBC yco+1
1230 STA plotto+3
1240 :
1250 CLC
1260 LDA plotto+1
1270 BPL normal
1280 SEC
1290 :
1300 .normal
1310 ROR plotto+1
1320 ROR plotto
1330 CLC
1340 LDA plotto+3
1350 BPL normal2
1360 SEC
1370 :
1380 .normal2
1390 ROR plotto+3
1400 ROR plotto+2
1410 LDA xco
1420 CLC
1430 ADC plotto
1440 STA xco
1450 LDA plotto+1
1460 ADC xco+1
1470 STA xco+1
1480 LDA yco
1490 CLC
1500 ADC plotto+2
1510 STA yco
```

Continued ▶

EIGHT BITS

◀ Continued

```
1520 :
1530 LDA yco
1540 LSR A
1550 LSR A
1560 LSR A
1570 STA address
1580 LDA #0
1590 STA address+1
1600 LDY #7
1610 :
1620 .doubleloop
1630 CLC
1640 ROL address
1650 ROL address+1
1660 DEY
1670 BNE doubleloop
1680 LDA yco
1690 LSR A
1700 LSR A
1710 AND #254
1720 CLC
1730 ADC address+1
1740 ADC #&30
1750 STA address+1
1760 LDA xco
1770 AND #248
1780 CLC
1790 ADC address
1800 STA address
1810 LDA address+1
1820 ADC xco+1
1830 STA address+1
1840 LDA xco
1850 AND #7
1860 TAX
1870 LDA yco
1880 AND #7
1890 TAY
1900 LDA (address),Y
1910 ORA powers,X
1920 STA (address),Y
1930 LDA flag
1940 BNE exit
1950 JMP mainloop
1960 :
1970 .powers
1980 EQUB 128
1990 EQUB 64
2000 EQUB 32
2010 EQUB 16
2020 EQUB 8
2030 EQUB 4
2040 EQUB 2
2050 EQUB 1
2060 :
2070 .char
2080 LDA #1
2090 STA flag
2100 RTS
2110 :
2120 .exit
2130 LDA oldevntv
2140 STA &220
2150 LDA oldevntv+1
2160 STA &221
2170 RTS
2180 ]
2190 NEXT
2200 ENDPROC
```

Listing 2

```
10 REM BasGask (EB2)
20 REM by Andrew Pepperell
30 REM for B/B+/M/C/E
40 REM (c) BAU Jan 91
50 :
60 MODE 0
70 *LOAD GCode
80 PROCsetup
90 :
100 ON ERROR VDU 7:PROCoptions
110 REPEAT
120 VDU 26,12
130 PROCcoords
140 PROCgasket
150 PROCoptions
160 UNTIL FALSE
170 END
180 :
190 DEF PROCsetup
200 *FX 4,1
210 VDU 23,224,255,195,195,195,195,195,195,255
220 DIM block 640
230 DIM x(2),y(2)
240 x(0)=0:y(0)=255
250 x(1)=319:y(1)=0
260 x(2)=639:y(2)=255
270 c=0
280 ENDPROC
290 :
300 DEF PROCcoords
310 *FX 12,1
320 GCOL 4,0
330 PROCcursor
340 MOVE x(0)*2,1020-(y(0)*4)
350 DRAW x(1)*2,1020-(y(1)*4)
360 DRAW x(2)*2,1020-(y(2)*4)
370 DRAW x(0)*2,1020-(y(0)*4)
380 REPEAT
390 *FX 15,1
400 G%=GET
410 PROCcursor
420 PROClines
430 gap=1
440 IF INKEY(-1) gap=5
450 IF INKEY(-2) gap=20
460 IF G%=136 x(c)=x(c)-gap
470 IF G%=137 x(c)=x(c)+gap
480 IF G%=138 y(c)=y(c)+gap
490 IF G%=139 y(c)=y(c)-gap
500 IF x(c)<0 x(c)=0
510 IF x(c)>639 x(c)=639
520 IF y(c)<0 y(c)=0
530 IF y(c)>255 y(c)=255
540 PROClines
550 IF G%=32 c=(c+1) MOD 3
560 PROCcursor
570 UNTIL G%=13
580 *FX 12,8
590 ENDPROC
600 :
610 DEF PROCcursor
620 MOVE x(c)*2-8,1036-(y(c)*4)
630 VDU 5,224,4
640 ENDPROC
650 :
660 DEF PROClines
670 c1=(c+1) MOD 3
680 c2=(c+2) MOD 3
690 MOVE x(c1)*2,1020-(y(c1)*4)
700 DRAW x(c)*2,1020-(y(c)*4)
710 DRAW x(c2)*2,1020-(y(c2)*4)
720 ENDPROC
730 :
740 DEF PROCgasket
750 A%=x(0):B%=y(0)
760 C%=x(1):D%=y(1)
770 E%=x(2):F%=y(2)
780 CALL &900
790 *FX 15,1
800 ENDPROC
810 :
820 DEF PROCoptions
830 FOR loop=0 TO 637 STEP 4
840 block!loop=loop!&3000
850 NEXT
860 PRINTTAB(0,0);STRING$(80," ")
870 PRINTTAB(4,0)"1.Save Screen"
880 PRINTTAB(25,0)"2.Print Screen"
890 PRINTTAB(45,0)"3.Plot Gasket"
900 PRINTTAB(65,0)"4.Load Code"
910 REPEAT
920 key=GET
930 UNTIL key>48 AND key<53
940 IF key=49 PROCsave
950 IF key=50 PROCprint
960 IF key=51 ENDPROC
970 IF key=52 OSCLI("LOAD GCode")
980 GOTO 860
990 :
1000 DEF PROCsave
1010 PRINTTAB(0,0);STRING$(80," ")
1020 INPUTTAB(20,0)"Filename: "fname$
1030 PROCrestore
1040 OSCLI("SAVE "+fname$+" 3000 8000")
1050 ENDPROC
1060 :
1070 DEF PROCprint
1080 PRINTTAB(0,0);STRING$(80," ")
1090 INPUTTAB(20,0)"Command: *"comm$
1100 PROCrestore
1110 OSCLI(comm$)
1120 ENDPROC
1130 :
1140 DEF PROCrestore
1150 FOR loop=0 TO 637 STEP 4
1160 loop!&3000=block!loop
1170 NEXT
1180 ENDPROC
1190 :
1200 DEF PROCloadcode
1210 *LOAD GCode
1220 ENDPROC
```

Listing 3

```
10 REM File Alterer (EB3)
20 REM by Andrew Pepperell
30 REM for B/B+/M/C/E
40 REM (c) BAU Jan 91
50 :
60 PROCassemble
70 PROCchecksum
80 PROCsavecode
90 END
100 :
110 DEF PROCchecksum
120 I%=0
130 FOR M%=start TO P%-1
140 I%=I%+?M%
150 NEXT
160 IF I%=109695 ENDPROC
170 VDU 7
180 PRINT "Error in Code"
190 END
200 :
210 DEF PROCsavecode
220 name$="AltFile"
230 OSCLI("SAVE "+name$+" "+STR$~start+" "+STR$~P%)
240 ENDPROC
250 :
260 DEF PROCassemble
270 osargs=&FFDA
280 osfind=&FFCE
290 osbget=&FFD7
300 osbput=&FFD4
310 oswrch=&FFEE
320 osrdch=&FFE0
330 osnewl=&FFE7
340 osbyte=&FFF4
350 buffer=&A8
360 newptr=&AA
370 channel=&AE
380 oldbyte=&AF
390 start=&900
400 :
410 FOR pass=0 TO 3 STEP 3
420 P%=start
430 [
440 OPT pass
450 LDA #12
460 JSR oswrch
470 LDA #1
480 LDY #0
490 LDX #buffer
500 JSR osargs
510 JSR readstart
520 LDA #&C0
530 LDX buffer
540 LDY buffer+1
550 JSR osfind
560 STA channel
570 JSR writeptr
580 LDA #0
590 STA bytex
600 STA bytey
610 JSR readbytes
620 JSR displaybytes
630 LDA #4
640 LDX #1
650 JSR osbyte
660 :
670 .mainloop
680 JSR showcursor
690 JSR osrdch
700 BCS close
710 CMP #13
720 BEQ close
730 CMP #ASC":"
740 BEQ up
750 CMP #ASC"*"
760 BEQ up
770 CMP #ASC"/"
780 BEQ down
790 CMP #ASC"?"
800 BEQ down
810 CMP #ASC"Z"
820 BEQ left
830 CMP #ASC"z"
840 BEQ left
850 CMP #ASC"X"
860 BEQ right
870 CMP #ASC"x"
880 BEQ right
890 CMP #139
900 BEQ back
910 CMP #138
920 BEQ forwards
930 CMP #ASC"C"
940 BEQ asc
950 CMP #ASC"c"
960 BEQ asc
970 CMP #136
980 BEQ decbyte
990 CMP #137
1000 BEQ incbyte
1010 JMP mainloop
1020 :
1030 .close
1040 JMP exit
1050 :
1060 .up
1070 JMP cursorup
1080 :
1090 .down
1100 JMP cursordown
1110 :
1120 .left
1130 JMP cursorleft
1140 :
1150 .right
1160 JMP cursorright
1170 :
1180 .back
1190 JMP scrollback
1200 :
1210 .forwards
1220 JMP scrollforwards
1230 :
1240 .asc
1250 LDA #0
1260 STA buffer
1270 JMP enterchar
1280 :
1290 .decbyte
1300 LDA #1
1310 STA buffer
1320 JMP enterchar
1330 :
1340 .incbyte
1350 LDA #2
1360 STA buffer
1370 JMP enterchar
1380 :
1390 .readbytes
1400 LDY channel
1410 LDX #0
1420 .getloop
1430 JSR osbget
1440 INX
1450 CPX #160
1460 BNE getloop
1470 :
1480 .writeptr
1490 LDY channel
1500 LDX #newptr
1510 LDA #1
1520 JMP osargs
1530 :
1540 .displaybytes
1550 LDA #30
1560 JSR oswrch
1570 LDA #0
1580 STA row
1590 :
1600 .rowloop
1610 LDA row
1620 ASL A:ASL A
1630 ASL A
1640 STA temp
1650 LDA newptr
1660 CLC
1670 ADC temp
1680 STA oldptr
1690 LDA newptr+1
1700 ADC #0
1710 STA oldptr+1
1720 LDA newptr+2
1730 ADC #0
1740 STA oldptr+2
1750 JSR printhex
1760 LDA oldptr+1
1770 JSR printhex
1780 LDA oldptr
1790 JSR printhex
1800 LDA #32
1810 JSR oswrch
1820 LDY #0
1830 :
1840 .byte8loop
1850 LDA #31
1860 JSR oswrch
1870 TYA
1880 STA temp
1890 CLC
1900 ADC temp
1910 ADC temp
1920 ADC #7
1930 JSR oswrch
1940 LDA row
1950 JSR oswrch
1960 LDY channel
1970 JSR osbget
1980 PHA
1990 JSR printhex
2000 LDA #31
2010 JSR oswrch
2020 LDA temp
2030 CLC
2040 ADC #31
2050 JSR oswrch
2060 LDA row
2070 JSR oswrch
2080 PLA
2090 JSR printchar
2100 LDY temp
2110 INY
2120 CPY #8
2130 BNE byte8loop
2140 JSR osnewl
2150 INC row
2160 LDA row
2170 CMP #20
```

Continued ▶

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```
2180 BEQ rts
2190 JMP rowloop
2200 :
2210 .rts
2220 RTS
2230 :
2240 .oldptr
2250 EQUW 0
2260 EQUB 0
2270 :
2280 .row
2290 EQUB 0
2300 :
2310 .bytex
2320 EQUB 0
2330 :
2340 .bytey
2350 EQUB 0
2360 :
2370 .temp
2380 EQUB 0
2390 :
2400 .printhex
2410 PHA
2420 LSR A
2430 LSR A
2440 LSR A
2450 LSR A
2460 TAX
2470 LDA digits,X
2480 JSR oswrch
2490 PLA
2500 AND #15
2510 TAX
2520 LDA digits,X
2530 JMP oswrch
2540 :
2550 .digits
2560 EQUS ("0123456789ABCDEF")
2570 :
2580 .printchar
2590 CMP #32
2600 BCC dot
2610 CMP #127
2620 BCS dot
2630 JMP oswrch
2640 :
2650 .dot
2660 LDA #ASC"."
2670 JMP oswrch
2680 :
2690 .exit
2700 LDA #0
2710 LDY channel
2720 JSR osfind
2730 LDA #4
2740 LDX #0
2750 JSR osbyte
2760 LDA #31
2770 JSR oswrch
2780 LDA #0
2790 JSR oswrch
2800 LDA #20
2810 JMP oswrch
2820 :
2830 .showcursor
2840 LDA #31
2850 JSR oswrch
2860 LDA bytex
2870 CLC
2880 ADC bytex
2890 ADC bytex
2900 ADC #7
2910 JSR oswrch
2920 LDA bytey
2930 JMP oswrch
2940 :
2950 .cursorleft
2960 LDA bytex
2970 BEQ exitcursorleft
2980 DEC bytex
2990 :
3000 .exitcursorleft
3010 JMP mainloop
3020 :
3030 .cursorright
3040 LDA bytex
3050 CMP #7
3060 BEQ exitcursorleft
3070 INC bytex
3080 JMP mainloop
3090 :
3100 .cursordown
3110 LDA bytey
3120 CMP #19
3130 BEQ exitcursorleft
3140 INC bytey
3150 JMP mainloop
3160 :
3170 .cursorup
3180 LDA bytey
3190 BEQ exitcursorleft
3200 DEC bytey
3210 JMP mainloop
3220 :
3230 .scrollback
3240 LDX #0
3250 :
3260 .sbackloop
3270 LDA newptr,X
3280 BNE oksback
3290 INX
3300 CPX #3
3310 BNE sbackloop
3320 JMP mainloop
3330 :
3340 .oksback
3350 SEC
3360 LDA newptr
3370 SBC #8
3380 STA newptr
3390 LDA newptr+1
3400 SBC #0
3410 STA newptr+1
3420 LDA newptr+2
3430 SBC #0
3440 STA newptr+2
3450 JSR writeptr
3460 JSR displaybytes
3470 JSR writeptr
3480 JMP mainloop
3490 :
3500 .eof
3510 LDA oldptr
3520 STA newptr
3530 LDA oldptr+1
3540 STA newptr+1
3550 LDA oldptr+2
3560 STA newptr+2
3570 JSR writeptr
3580 JMP mainloop
3590 :
3600 .eightbyteshere
3610 EQUD 0
3620 EQUD 0
3630 :
3640 .scrollforwards
3650 LDA newptr
3660 STA oldptr
3670 LDA newptr+1
3680 STA oldptr+1
3690 LDA newptr+2
3700 STA oldptr+2
3710 CLC
3720 LDA newptr
3730 ADC #160
3740 STA newptr
3750 LDA newptr+1
3760 ADC #0
3770 STA newptr+1
3780 LDA newptr+2
3790 ADC #0
3800 STA newptr+2
3810 JSR writeptr
3820 LDX #0
3830 LDY channel
3840 :
3850 .testloop
3860 JSR osbget
3870 BCS eof
3880 STA eightbyteshere,X
3890 INX
3900 CPX #8
3910 BNE testloop
3920 CLC
3930 LDA oldptr
3940 ADC #8
3950 STA newptr
3960 LDA oldptr+1
3970 ADC #0
3980 STA newptr+1
3990 LDA oldptr+2
4000 ADC #0
4010 STA newptr+2
4020 JSR writeptr
4030 JSR displaybytes
4040 JSR writeptr
4050 JMP mainloop
4060 :
4070 .enterchar
4080 LDA newptr
4090 STA oldptr
4100 LDA newptr+1
4110 STA oldptr+1
4120 LDA newptr+2
4130 STA oldptr+2
4140 LDA bytey
4150 ASL A
4160 ASL A
4170 ASL A
4180 CLC
4190 ADC bytex
4200 STA buffer+1
4210 CLC
4220 ADC newptr
4230 STA newptr
4240 LDA newptr+1
4250 ADC #0
4260 STA newptr+1
4270 LDA newptr+2
4280 ADC #0
4290 STA newptr+2
4300 JSR writeptr
4310 JSR osbget
4320 STA oldbyte
4330 LDA buffer
4340 BEQ continue
4350 CMP #1
4360 BEQ decr
4370 INC oldbyte
4380 JSR writeptr
4390 LDA oldbyte
4400 LDY channel
4410 JSR osbput
4420 JMP correctdisplay
4430 :
4440 .decr
4450 DEC oldbyte
4460 JSR writeptr
4470 LDY channel
4480 LDA oldbyte
4490 JSR osbput
4500 JMP correctdisplay
4510 :
4520 .continue
4530 LDA #ASC"?"
4540 JSR oswrch
4550 LDA #32
4560 JSR oswrch
4570 LDA #8
4580 JSR oswrch
4590 JSR osrdch
4600 CMP #135
4610 BEQ restore
4620 PHA
4630 JSR writeptr
4640 PLA
4650 LDY channel
4660 JSR osbput
4670 JMP correctdisplay
4680 :
4690 .restore
4700 JSR writeptr
4710 LDA oldbyte
4720 LDY channel
4730 JSR osbput
4740 :
4750 .correctdisplay
4760 PHA
4770 JSR showcursor
4780 PLA
4790 PHA
4800 JSR printhex
4810 PLA
4820 JSR showasc
4830 JMP mainloop
4840 :
4850 .showasc
4860 STA oldbyte
4870 LDA #31
4880 JSR oswrch
4890 LDA bytex
4900 CLC
4910 ADC #31
4920 JSR oswrch
4930 LDA bytey
4940 JSR oswrch
4950 LDA oldbyte
4960 JSR printchar
4970 LDA oldptr
4980 STA newptr
4990 LDA oldptr+1
5000 STA newptr+1
5010 LDA oldptr+2
5020 STA newptr+2
5030 JSR writeptr
5040 RTS
5050 :
5060 .readstart
5070 LDA #0
5080 STA newptr
5090 STA newptr+1
5100 STA newptr+2
5110 STA newptr+3
5120 :
5130 .readstloop
5140 LDA (buffer),Y
5150 CMP #13
5160 BEQ noaddr
5170 CMP #32
5180 BEQ readaddr
5190 CMP #ASC","
5200 BEQ readaddr
5210 INY
5220 JMP readstloop
5230 :
5240 .noaddr
5250 LDA newptr
5260 AND #248
5270 STA newptr
5280 RTS
5290 :
5300 .readaddr
5310 LDA #13
5320 STA (buffer),Y
5330 INY
5340 :
5350 .readhexloop
5360 LDA (buffer),Y
5370 CMP #13
5380 BEQ noaddr
5390 JSR whichhex
5400 PHA
5410 LDX #4
5420 :
5430 .doubleloop
5440 CLC
5450 ROL newptr
5460 ROL newptr+1
5470 ROL newptr+2
5480 ROL newptr+3
5490 DEX
5500 BNE doubleloop
5510 PLA
5520 CLC
5530 ADC newptr
5540 STA newptr
5550 LDA newptr+1
5560 ADC #0
5570 STA newptr+1
5580 LDA newptr+2
5590 ADC #0
5600 STA newptr+2
5610 INY
5620 JMP readhexloop
5630 :
5640 .whichhex
5650 STA channel
5660 LDX #0
5670 :
5680 .whichloop
5690 LDA digits,X
5700 CMP channel
5710 BEQ found
5720 INX
5730 CPX #16
5740 BNE whichloop
5750 LDA #0
5760 RTS
5770 :
5780 .found
5790 TXA
5800 RTS
5810 ]
5820 NEXT
5830 ENDPROC
```

Listing 4

```
10 REM BASIC move (EB4)
20 REM by Andrew Pepperell
30 REM for B/B+/M/C/E
40 REM (c) BAU Jan 91
50 :
60 PROCassemble
70 PROCchecksum
80 PROCsavecode
90 END
100 :
110 DEF PROCchecksum
120 I%=0
130 FOR M%=start TO P%-1
140 I%=I%+?M%
150 NEXT
160 IF I%=51287 ENDPROC
170 VDU 7
180 PRINT "Error in Code."
190 END
200 :
210 DEF PROCsavecode
220 name$="BasMove"
230 OSCLI("SAVE "+name$+" "+STR$~start
+" "+STR$~(P%-1))
240 ENDPROC
250 :
260 DEF PROCassemble
270 page=&18
280 toplo=&12
290 tophi=&13
300 osargs=&FFDA
310 nextspace=&70
320 startofline=&72
330 endofline=&74
340 startline=&76
350 finishline=&78
360 pointer=&7A
370 untilline=&7C
380 length=&7E
390 currentline=&A8
400 start=&900
410 :
420 FOR pass=0 TO 3 STEP 3
430 P%=start
440 [
450 OPT pass
460 LDA #1
470 LDY #0
480 LDX #pointer
```

Continued ▶

EIGHT BITS

◀ Continued

```
490 JSR osargs
500 LDY #0
510 LDA (pointer),Y
520 CMP #13
530 BEQ badsyntax
540 JMP syntaxok
550 :
560 .badsyntax
570 BRK
580 EQUB 16
590 EQUS ("BasMove <startline> (<endline>)")
600 BRK
610 :
620 .readlinenumber
630 LDA #0
640 STA finishline
650 STA finishline+1
660 LDX length
670 LDY #0
680 :
690 .readloop
700 STX temp
710 STX temp+1
720 LDA (pointer),Y
730 JSR whichdigit
740 TAX
750 BEQ done
760 STY temp+2
770 DEC temp+1
780 ASL temp+1
790 LDY temp+1
800 :
810 .readloop2
820 LDA data,Y
830 CLC
840 ADC finishline
850 STA finishline
860 LDA finishline+1
870 ADC data+1,Y
880 STA finishline+1
890 DEX
900 BNE readloop2
910 :
920 .done
930 LDY temp+2
940 INY
950 LDX temp
960 DEX
970 BNE readloop
980 RTS
990 :
1000 .data
1010 EQUW 1
1020 EQUW 10
1030 EQUW 100
1040 EQUW 1000
1050 EQUW 10000
1060 :
1070 .whichdigit
1080 STA temp+3
1090 LDX #0
1100 :
1110 .whichloop
1120 LDA digits,X
1130 CMP temp+3
1140 BNE nextdigit
1150 TXA
1160 RTS
1170 :
1180 .nextdigit
1190 INX
1200 CPX #10
1210 BNE whichloop
1220 JMP badsyntax
1230 :
1240 .digits
1250 EQUS "0123456789"
1260 :
1270 .temp
1280 EQUD (0)
1290 :
1300 .syntaxok
1310 LDA (pointer),Y
1320 CMP #32
1330 BEQ found
1340 CMP #13
1350 BEQ found
1360 CMP #ASC","
1370 BEQ found
1380 INY
1390 CPY #6
1400 BNE syntaxok
1410 JMP badsyntax
1420 :
1430 .found
1440 STY length
1450 JSR readlinenumber
1460 LDA finishline
1470 STA startline
1480 LDA finishline+1
1490 STA startline+1
1500 LDY length
1510 :
1520 .secondline
1530 LDA (pointer),Y
1540 CMP #13
1550 BEQ oneline
1560 CMP #ASC","
1570 BEQ next
1580 CMP #32
1590 BEQ next
1600 JMP readline2
1610 :
1620 .next
1630 INY
1640 JMP secondline
1650 :
1660 .oneline
1670 JMP domove
1680 :
1690 .readline2
1700 TYA
1710 CLC
1720 ADC pointer
1730 STA pointer
1740 LDA pointer+1
1750 ADC #0
1760 STA pointer+1
1770 LDY #0
1780 :
1790 .line2loop
1800 LDA (pointer),Y
1810 CMP #13
1820 BEQ readagain
1830 CMP #32
1840 BEQ readagain
1850 INY
1860 CPY #6
1870 BNE line2loop
1880 JMP badsyntax
1890 JMP line2loop
1900 :
1910 .readagain
1920 STY length
1930 JSR readlinenumber
1940 :
1950 .domove
1960 LDA toplo
1970 SEC
1980 SBC #1
1990 STA nextspace
2000 LDA tophi
2010 SBC #0
2020 STA nextspace+1
2030 LDA page
2040 STA startofline+1
2050 LDA #1
2060 STA startofline
2070 :
2080 .searchloop
2090 LDY #1
2100 LDA (startofline),Y
2110 DEY
2120 CMP startline
2130 BNE getnextline
2140 LDA (startofline),Y
2150 CMP startline+1
2160 BNE getnextline
2170 JMP startmove
2180 :
2190 .getnextline
2200 LDY #3
2210 :
2220 .getloop
2230 LDA (startofline),Y
2240 CMP #13
2250 BEQ foundnextline
2260 INY
2270 JMP getloop
2280 :
2290 .foundnextline
2300 INY
2310 TYA
2320 CLC
2330 ADC startofline
2340 STA startofline
2350 LDA startofline+1
2360 ADC #0
2370 STA startofline+1
2380 JMP searchloop
2390 :
2400 .startmove
2410 LDA startofline
2420 STA startline
2430 LDA startofline+1
2440 STA startline+1
2450 :
2460 .mainloop
2470 LDY #1
2480 LDA (startofline),Y
2490 STA currentline
2500 DEY
2510 LDA (startofline),Y
2520 STA currentline+1
2530 :
2540 .moveloop
2550 LDA (startofline),Y
2560 STA (nextspace),Y
2570 CPY #3
2580 BCS ok
2590 INY
2600 JMP moveloop
2610 :
2620 .ok
2630 CMP #13
2640 BEQ updateptrs
2650 INY
2660 JMP moveloop
2670 :
2680 .updateptrs
2690 INY
2700 TYA
2710 CLC
2720 ADC startofline
2730 STA startofline
2740 LDA startofline+1
2750 ADC #0
2760 STA startofline+1
2770 TYA
2780 CLC
2790 ADC nextspace
2800 STA nextspace
2810 LDA nextspace+1
2820 ADC #0
2830 STA nextspace+1
2840 LDA finishline
2850 CMP currentline
2860 BNE copynext
2870 LDA finishline+1
2880 CMP currentline+1
2890 BNE copynext
2900 JMP shuffledown
2910 :
2920 .copynext
2930 JMP mainloop
2940 :
2950 .shuffledown
2960 LDY #0
2970 :
2980 .shuffleloop
2990 LDA (startofline),Y
3000 STA (startline),Y
3010 LDA startofline
3020 CMP nextspace
3030 BNE nextbyte
3040 LDA startofline+1
3050 CMP nextspace+1
3060 BNE nextbyte
3070 LDA toplo
3080 SEC
3090 SBC #1
3100 STA nextspace
3110 LDA tophi
3120 SBC #0
3130 STA nextspace+1
3140 LDA #255
3150 LDY #0
3160 STA (nextspace),Y
3170 RTS
3180 :
3190 .nextbyte
3200 INC startofline
3210 BNE cont1
3220 INC startofline+1
3230 :
3240 .cont1
3250 INC startline
3260 BNE cont2
3270 INC startline+1
3280 :
3290 .cont2
3300 JMP shuffleloop
3310 ]
3320 NEXT
3330 ENDPROC
```

Listing 5

```
10 REM File Date Stamper (EB5)
20 REM by Andrew Pepperell
30 REM for B/B+/M/C/E +ADFS
40 REM (c) BAU Jan 91
50 :
60 PROCassemble
70 PROCchecksum
80 PROCsavecode
90 END
100 :
110 DEFPROCchecksum
120 I%=0
130 FOR M%=start TO P%-1
140 I%=I%+?M%
150 NEXT
160 IF I%=22558 ENDPROC
170 VDU 7
180 PRINT "Error in code."
190 END
200 :
210 DEFPROCsavecode
220 name$="DStamp"
230 OSCLI("SAVE "+name$+" "+STR$~start+" "+STR$~P%)
240 ENDPROC
250 :
260 DEFPROCassemble
270 osargs=&FFDA
280 osfile=&FFDD
290 pointer=&A8
300 temp=&AA
310 osword=&FFF1
320 start=&900
330 :
340 FOR pass=0 TO 3 STEP 3
350 P%=start
360 [
370 OPT pass
380 LDA #1
390 LDX #pointer
400 LDY #0
410 JSR osargs
420 LDY #0
430 LDA (pointer),Y
440 CMP #13
450 BNE syntaxok
460 BRK
470 EQUB 16
480 EQUS ("DStamp <fname>")
490 BRK
500 .syntaxok
510 LDA pointer
520 STA block
530 LDA pointer+1
540 STA block+1
550 LDA #5
560 LDX #block MOD 256
570 LDY #block DIV 256
580 JSR osfile
590 LDA #0
600 STA timedata
610 LDX #timedata MOD 256
620 LDY #timedata DIV 256
630 LDA #14
640 JSR osword
650 LDX #13
660 JSR readbytes
670 STA block+5
680 LDX #4
690 JSR readbytes
700 STA block+9
710 JSR readmonth
720 STA block+8
730 LDA #1
740 LDX #block MOD 256
750 LDY #block DIV 256
760 JSR osfile
770 RTS
780 .block
790 EQUD 0
800 EQUD 0
810 EQUD 0
820 EQUD 0
830 EQUW 0
840 .timedata
850 EQUS STRING$(25," ")
860 .readbytes
870 LDA timedata,X
880 SEC
890 SBC #48
900 ASL A
910 ASL A
920 ASL A
930 ASL A
940 STA temp
950 INX
960 LDA timedata,X
970 SEC
980 SBC #48
990 CLC
1000 ADC temp
1010 RTS
1020 .months
1030 EQUS "JanFebMarAprMayJun"
1040 EQUS "JulAugSepOctNovDec"
1050 .readmonth
1060 LDA #0
1070 STA temp
1080 .readloop
1090 CLC
1100 LDA temp
1110 ADC temp
1120 ADC temp
1130 TAX
1140 LDA months,X
1150 CMP timedata+7
1160 BNE next
1170 LDA months+1,X
1180 CMP timedata+8
1190 BNE next
1200 LDA months+2,X
1210 CMP timedata+9
1220 BNE next
1230 INC temp
1240 LDA temp
1250 RTS
1260 .next
1270 INC temp
1280 JMP readloop
1290 ]
1300 NEXT
1310 ENDPROC
```

Continued ▶

◀ Continued

Listing 6

```
10 REM File Date Reader (EB6)
20 REM by Andrew Pepperell
30 REM for B/B+/M/C/E +ADFS
40 REM (c) BAU Jan 91
50 :
60 PROCassemble
70 PROCchecksum
80 PROCsavecode
90 END
100 :
110 DEF PROCchecksum
120 I%=0
130 FOR M%=start TO P%-1
140 I%=I%+?M%
150 NEXT
160 IF I%=17221 ENDPROC
170 VDU 7
180 PRINT "Error in code."
190 END
200 :
210 DEF PROCsavecode
220 name$="When"
230 OSCLI("SAVE "+name$+" "+STR$~start
+" "+STR$~P%)
240 ENDPROC
250 :
260 DEF PROCassemble
270 osargs=&FFDA
280 osfile=&FFDD
290 oswrch=&FFEE
300 pointer=&A8
310 temp=&AA
320 start=&900
330 :
340 FOR pass=0 TO 3 STEP 3
350 P%=start
360 [
370 OPT pass
380 LDA #1
390 LDX #pointer
400 LDY #0
410 JSR osargs
420 LDY #0
430 LDA (pointer),Y
440 CMP #13
450 BNE syntaxok
460 BRK
470 EQUB 16
480 EQUS "When <fname>"
490 BRK
500 :
510 .syntaxok
520 LDA pointer
530 STA block
540 LDA pointer+1
550 STA block+1
560 LDA #5
570 LDX #block MOD 256
580 LDY #block DIV 256
590 JSR osfile
600 CMP #0
610 BNE ok
620 BRK
630 EQUB 214
640 EQUS "Not found"
650 BRK
660 :
670 .ok
680 LDX #0
690 :
700 .textloop
710 LDA date,X
720 CMP #13
730 BEQ done
740 JSR oswrch
750 INX
760 JMP textloop
770 :
780 .done
790 LDA block+9
800 JSR printbcd
810 LDA #ASC"-"
820 JSR oswrch
830 LDA block+8
840 JSR printbcd
850 LDA #ASC"-"
860 JSR oswrch
870 LDA #25
880 JSR printbcd
890 LDA block+5
900 JSR printbcd
910 JSR &FFE7
920 RTS
930 :
940 .date
950 EQUS "Date:"
960 EQUB 13
970 :
980 .printbcd
990 PHA
1000 LSR A
1010 LSR A
1020 LSR A
1030 LSR A
1040 TAX
1050 LDA digits,X
1060 JSR oswrch
1070 PLA
1080 AND #15
1090 TAX
1100 LDA digits,X
1110 JMP oswrch
1120 :
1130 .digits
1140 EQUS "0123456789"
1150 :
1160 .block
1170 EQUS STRING$(18," ")
1180 ]
1190 NEXT
1200 ENDPROC
```

Listing 7

```
10 REM File Identification System (EB
7)
20 REM by Andrew Pepperell
30 REM for B/B+/M/C/E
40 REM (c) BAU Jan 91
50 :
60 PROCassemble
70 PROCchecksum
80 PROCsavecode
90 END
100 :
110 DEF PROCchecksum
120 I%=0
130 FOR M%=start TO P%-1
140 I%=I%+?M%
150 NEXT
160 IF I%=23680 ENDPROC
170 VDU 7
180 PRINT "Error in Code."
190 END
200 :
210 DEF PROCsavecode
220 name$="SetType"
230 OSCLI("SAVE "+name$+" "+STR$~start
+" "+STR$~P%)
240 ENDPROC
250 :
260 DEF PROCassemble
270 start=&900
280 osargs=&FFDA
290 osfile=&FFDD
300 pointer=&A8
310 byte=&AA
320 temp=&AB
330 FOR pass=0 TO 3 STEP 3
340 P%=start
350 [
360 OPT pass
370 LDA #1
380 LDX #pointer
390 LDY #0
400 JSR osargs
410 LDY #0
420 LDA (pointer),Y
430 CMP #13
440 BNE syntaxok
450 :
460 .badsyntax
470 BRK
480 EQUB 16
490 EQUS "SetType <fname> <byte>"
500 BRK
510 :
520 .syntaxok
530 LDA (pointer),Y
540 CMP #ASC" "
550 BEQ endofname
560 CMP #ASC","
570 BEQ endofname
580 CMP #13
590 BEQ badsyntax
600 INY
610 JMP syntaxok
620 :
630 .endofname
640 LDA #13
650 STA (pointer),Y
660 INY
670 :
680 .nextargloop
690 LDA (pointer),Y
700 CMP #ASC " "
710 BEQ again
720 CMP #ASC ","
730 BEQ again
740 CMP #13
750 BEQ badsyntax
760 JMP carryon
770 :
780 .again
790 INY
800 JMP nextargloop
810 :
820 .carryon
830 LDA #0
840 STA byte
850 LDA (pointer),Y
860 JSR whichhex
870 STA byte
880 INY
890 LDA (pointer),Y
900 CMP #13
910 BEQ do
920 CMP #32
930 BEQ do
940 ASL byte
950 ASL byte
960 ASL byte
970 ASL byte
980 JSR whichhex
990 CLC
1000 ADC byte
1010 STA byte
1020 :
1030 .do
1040 LDA pointer
1050 STA block
1060 LDA pointer+1
1070 STA block+1
1080 LDA #5
1090 LDX #block MOD 256
1100 LDY #block DIV 256
1110 JSR osfile
1120 CMP #2
1130 BNE continue
1140 BRK
1150 EQUB 16
1160 EQUS "Directory"
1170 BRK
1180 :
1190 .continue
1200 LDA byte
1210 STA block+4
1220 LDA #1
1230 JSR osfile
1240 RTS
1250 :
1260 .digits
1270 EQUS "0123456789ABCDEF"
1280 :
1290 .whichhex
1300 STA temp
1310 LDX #0
1320 :
1330 .whichloop
1340 LDA digits,X
1350 CMP temp
1360 BEQ founddigit
1370 INX
1380 CPX #16
1390 BNE whichloop
1400 JMP badsyntax
1410 :
1420 .founddigit
1430 TXA
1440 RTS
1450 :
1460 .block
1470 EQUS STRING$(18," ")
1480 ]
1490 NEXT
1500 ENDPROC
```

Listing 8

```
10 REM File Identification System (EB
8)
20 REM by Andrew Pepperell
30 REM for B/B+/M/C/E
40 REM (c) BAU Jan 91
50 :
60 PROCassemble
70 PROCchecksum
80 PROCsavecode
90 END
100 :
110 DEF PROCchecksum
120 I%=0
130 FOR M%=start TO P%-1
140 I%=I%+?M%
150 NEXT
160 IF I%=28873 ENDPROC
170 VDU 7
180 PRINT "Error in Code."
190 END
200 :
210 DEF PROCsavecode
220 name$="Ident"
230 OSCLI("SAVE "+name$+" "+STR$~start
+" "+STR$~P%)
240 ENDPROC
250 :
260 DEF PROCtable
270 [
280 OPT pass
290 EQUB 1
300 EQUW code
310 EQUB 2
320 EQUW screen
330 EQUB 3
340 EQUW exec
350 EQUB 4
360 EQUW text
370 EQUB 9
380 EQUW utility
390 EQUB &10
400 EQUW doc
410 EQUB &11
420 EQUW sheet
430 EQUB &80
440 EQUW romimage
450 EQUB &FF
460 EQUW basic
470 EQUB 0
480 :
490 .basic
500 EQUS "Basic"
510 EQUB 13
520 :
530 .code
540 EQUS "Machine Code"
550 EQUB 13
560 :
570 .screen
580 EQUS "Screen"
590 EQUB 13
600 :
610 .romimage
620 EQUS "Rom Image"
630 EQUB 13
640 :
650 .exec
660 EQUS "*Exec File"
670 EQUB 13
680 :
690 .text
700 EQUS "Text File"
710 EQUB 13
720 :
730 .utility
740 EQUS "Utility"
750 EQUB 13
760 :
770 .doc
780 EQUS "View Document"
790 EQUB 13
800 :
810 .sheet
820 EQUS "ViewSheet File"
830 EQUB 13
840 ]
850 ENDPROC
860 :
870 DEF PROCassemble
880 start=&900
890 osargs=&FFDA
900 osfile=&FFDD
910 osasci=&FFE3
920 pointer=&A8
930 byte=&AA
940 messaddr=&AB
950 :
960 FOR pass=0 TO 3 STEP 3
970 P%=start
980 [
990 OPT pass
1000 LDA #1
1010 LDX #pointer
1020 LDY #0
1030 JSR osargs
1040 LDY #0
1050 LDA (pointer),Y
1060 CMP #13
1070 BNE syntaxok
1080 :
1090 .badsyntax
1100 BRK
1110 EQUB 16
1120 EQUS "Ident <fname>"
1130 BRK
1140 :
1150 .syntaxok
1160 LDA pointer
1170 STA block
1180 LDA pointer+1
1190 STA block+1
1200 LDX #block MOD 256
1210 LDY #block DIV 256
1220 LDA #5
1230 JSR osfile
1240 CMP #2
1250 BNE ok
1260 BRK
1270 EQUB 189
1280 EQUB 11
1290 EQUS "Directory"
1300 BRK
1310 :
1320 .ok
1330 LDA block+4
1340 STA byte
1350 LDA #typetable MOD 256
1360 STA pointer
1370 LDA #typetable DIV 256
1380 STA pointer+1
1390 LDY #0
1400 :
```

Continued ▶

EIGHT BITS

◀ **Continued**

```
1410 .compareloop
1420 LDA (pointer),Y
1430 BEQ unknown
1440 CMP byte
1450 BEQ printtype
1460 LDA pointer
1470 CLC
1480 ADC #3
1490 STA pointer
1500 LDA pointer+1
1510 ADC #0
1520 STA pointer+1
1530 JMP compareloop
1540 :
1550 .unknown
1560 BRK
1570 EQUB 214
1580 EQUB 11
1590 EQUS "Unknown file type"
1600 BRK
1610 :
1620 .printtype
1630 INY
1640 LDA (pointer),Y
1650 STA messaddr
1660 INY
1670 LDA (pointer),Y
1680 STA messaddr+1
1690 LDY #255
1700 :
1710 .printtypeloop
1720 INY
1730 LDA (messaddr),Y
1740 JSR osasci
1750 CMP #13
1760 BNE printtypeloop
1770 RTS
1780 :
1790 .block
1800 EQUS STRING$(18," ")
1810 :
1820 .typetable
1830 ]
1840 PROCtable
1850 NEXT
1860 ENDPROC
```

Listing 9

```
   10 REM File Identification System (EB
9)
   20 REM by Andrew Pepperell
   30 REM for B/B+/M/C/E
   40 REM (c) BAU Jan 91
   50 :
   60 PROCassemble
   70 PROCchecksum
   80 PROCsavecode
   90 END
  100 :
  110 DEF PROCchecksum
  120 I%=0
  130 FOR M%=start TO P%-1
  140 I%=I%+?M%
  150 NEXT
  160 IF I%=22009 ENDPROC
  170 VDU 7
  180 PRINT "Error in Code."
  190 END
  200 :
  210 DEF PROCsavecode
  220 name$="LTypes"
  230 OSCLI("SAVE "+name$+" "+STR$~start
+" "+STR$~P%)
  240 ENDPROC
  250 :
  260 DEF PROCtable
  270 [
  280 OPT pass
  290 EQUB 1
  300 EQUW code
  310 EQUB 2
  320 EQUW screen
  330 EQUB 3
  340 EQUW exec
  350 EQUB 4
  360 EQUW text
  370 EQUB 9
  380 EQUW utility
  390 EQUB &10
  400 EQUW doc
  410 EQUB &11
  420 EQUW sheet
  430 EQUB &80
  440 EQUW romimage
  450 EQUB &FF
  460 EQUW basic
  470 EQUB 0
  480 :
  490 .basic
  500 EQUS "Basic"
  510 EQUB 13
  520 :
  530 .code
  540 EQUS "Machine Code"
  550 EQUB 13
  560 :
  570 .screen
  580 EQUS "Screen"
  590 EQUB 13
  600 :
  610 .romimage
  620 EQUS "Rom Image"
  630 EQUB 13
  640 :
  650 .exec
  660 EQUS "*Exec File"
  670 EQUB 13
  680 :
  690 .text
  700 EQUS "Text File"
  710 EQUB 13
  720 :
  730 .utility
  740 EQUS "Utility"
  750 EQUB 13
  760 :
  770 .doc
  780 EQUS "View Document"
  790 EQUB 13
  800 :
  810 .sheet
  820 EQUS "ViewSheet File"
  830 EQUB 13
  840 ]
  850 ENDPROC
  860 :
  870 DEF PROCassemble
  880 start=&900
  890 osasci=&FFE3
  900 pointer=&A8
  910 messaddr=&AA
  920 :
  930 FOR pass=0 TO 3 STEP 3
  940 P%=start
  950 [
  960 OPT pass
  970 LDA #typetable MOD 256
  980 STA pointer
  990 LDA #typetable DIV 256
 1000 STA pointer+1
 1010 :
 1020 .compareloop
 1030 LDY #0
 1040 LDA (pointer),Y
 1050 BEQ done
 1060 JSR printtype
 1070 LDA pointer
 1080 CLC
 1090 ADC #3
 1100 STA pointer
 1110 LDA pointer+1
 1120 ADC #0
 1130 STA pointer+1
 1140 JMP compareloop
 1150 :
 1160 .done
 1170 RTS
 1180 :
 1190 .printtype
 1200 JSR printhex
 1210 INY
 1220 LDA (pointer),Y
 1230 STA messaddr
 1240 INY
 1250 LDA (pointer),Y
 1260 STA messaddr+1
 1270 LDY #255
 1280 :
 1290 .printtypeloop
 1300 INY
 1310 LDA (messaddr),Y
 1320 JSR osasci
 1330 CMP #13
 1340 BNE printtypeloop
 1350 RTS
 1360 :
 1370 .digits
 1380 EQUS "0123456789ABCDEF"
 1390 :
 1400 .printhex
 1410 PHA
 1420 LSR A
 1430 LSR A
 1440 LSR A
 1450 LSR A
 1460 TAX
 1470 LDA digits,X
 1480 JSR osasci
 1490 PLA
 1500 AND #15
 1510 TAX
 1520 LDA digits,X
 1530 JSR osasci
 1540 LDA #32
 1550 JSR osasci
 1560 RTS
 1570 :
 1580 .typetable
 1590 ]
 1600 PROCtable
 1610 NEXT
 1620 ENDPROC
```

HATTRIX

Listing 1

```
   10 REM Create (for HatTrix)
   20 REM By Bryan Cloud
   30 REM For BBC B/B+/M/C
   40 REM (c) BAU Jan 1991
   50 :
   60 DIM osfile &11,name 16
   70 $name="HatTrix"
   80 chs$="0123456789ABCDEFGHIJKLMNOPQR
STUVWXYZ"
   90 READ line$
  100 line=0
  110 count=0
  120 byte=0
  130 err=FALSE
  140 out=OPENOUT($name)
  150 REPEAT
  160 check=0
  170 FOR i%=1 TO LEN(line$)-3
  180 char$=MID$(line$,i%,1)
  190 val=INSTR(chs$,char$)-1
  200 check=check+val
  210 PRINTCHR$13;RIGHT$("     "+STR$(li
ne*10+500),5);" ";RIGHT$("00"+STR$~check
,2);"   ";CHR$8;CHR$8;
  220 PROCbput(val)
  230 NEXT
  240 line=line+1
  250 IF (check MOD 256)=EVAL("&"+RIGHT$
(line$,2)) PRINT"OK"; ELSE PRINT"Error!"
:err=TRUE
  260 READ line$
  270 UNTIL line$="end"
  280 CLOSE #out
  290 IF err PRINT:OSCLI"Delete "+$name:
END
  300 !osfile=name
  310 osfile!2=&1100
  320 osfile!6=&1100
  330 osfile!10=2871
  340 osfile!14=&33
  350 X%=osfile MOD 256
  360 Y%=osfile DIV 256
  370 A%=1
  380 CALL &FFDD
  390 PRINTCHR$13;"Data correct, '";$nam
e;"' saved."
  400 END
  410 :
  420 DEF PROCbput(bits)
  430 FOR bit=4 TO 0 STEP -1
  440 byte=byte OR (SGN(bits AND (2^bit)
) * 2^count)
  450 count=count+1
  460 IF count=8 BPUT#out,byte:byte=0:co
unt=0
  470 NEXT
  480 ENDPROC
  490 :
  500 DATA 8ME0BQ04CBK9AO250IOG0VRHG1/48
  510 DATA VPB0250AOG0VRHG1VPA0512QAN/5D
  520 DATA H8CMIK0A2LKL7MGTD580K439A5/42
  530 DATA 51GQAG18A6IKNQ3HKL02GS358C/41
  540 DATA K4GG97R8IK0A20D1G6GIP8FHIK/4A
  550 DATA 2A2S840F466S8BJUAG98BH0IDS/37
  560 DATA G10F51HN22RFCT0QAHGSKTBABH/68
  570 DATA L7QP99780D22ITC3P08L00MC4J/2E
  580 DATA B04J19EMICUGQO25O02KG2TOKK/72
  590 DATA M0NE550OEAE5L5GQJPD40G1KG4/5A
  600 DATA A00FC29J028G8M00A231LGGIOH/FB
  610 DATA E0LK3AI9IJ12FQA0CJ807LL59N/37
  620 DATA 8LSG9P781U84BF84SJK0M64L52/4A
  630 DATA GV35C0K40QB0CJ0G7PP9A1II00/20
  640 DATA NJ37G45V99811VA6E0CL02GS98/25
  650 DATA 84K62AB0AGA1869H2GCJ2A2H25/E1
  660 DATA 8G22QA55U6GG8210INVQ314L02/1A
  670 DATA GO38FH68GCH9A632J498A6KN3A/1C
  680 DATA DH51OOIC836C0H1IG3UAIEG0IO/48
  690 DATA 04CB4348A8IK0A2HL5OQA7V8E6/1B
  700 DATA CB26CH55OG5R19A4IC60RO4L02/18
  710 DATA GG2CHN912K811D50296A0F0I9Q/F1
  720 DATA 02B00HHCGCH1912K811D52IS94/E2
  730 DATA Q01489AG51OIAG18A46BC4H986/F4
  740 DATA 32J09886KM3AD151GOI8836GKK/0D
  750 DATA 31H5G1KM39D00BI2IGC74NG2IO/19
  760 DATA D5O0K56ABHIIK7608D180H52G2/FC
  770 DATA OOCV608IH81E4AAHGOIO1QBHKM/7F
  780 DATA O19A3J0498K0UE4JK04M0132P0/FB
  790 DATA P3EI554QGGD9D6K634A1045KK5/0F
  800 DATA 0PK4CO2AAH0OIOG5B9E4IO0004/3F
  810 DATA 4J804I15A08K062H51OIASG11F/F1
  820 DATA VUIIO3QGKMM504G48N4097R8IN/82
  830 DATA 04A9G451KAA0A50022GQ555G7P/ED
  840 DATA 05GOIO808HE8CCM091T88NOG9P/54
  850 DATA 781V0355K88N7GAQ1ITVVPA051/49
  860 DATA 26ITCKL11QEVG60SKS75B78430/44
  870 DATA EAF5IGA1850P0HA1I138F1A58A/EA
  880 DATA C4ALKNGQDGD1S58QC8ALKKB980/69
  890 DATA QIA99A23L5S4EAE3L1S58PE004/24
  900 DATA B3KA24CLVUCVG605VIAG12F124/3A
  910 DATA 4DV5F00HRVU1ILNK6SH8AENM6S/A2
  920 DATA H8EE6P700BU810K07I4RP0CQHV/48
  930 DATA L8BSK0UA55QO7IH9E13IBG18E1/46
  940 DATA KKGPEG04B3KA28B3QPHTC1L5QQ/73
  950 DATA 9JQ398KN0HH5G0K70QA8CM8025/24
  960 DATA HQ5145JTCPUM0QIHC74N0AGHC3/68
  970 DATA A0CEBABG8SIS8A3GD546BG0120/1D
  980 DATA T2GI21L52OC9C0L12O4K0PSMKN/57
  990 DATA 0HH5GGK70QA8CM0025HQ51443O/F3
 1000 DATA BFOJ2C9I22H51AEP3Q53PG4KU2/40
 1010 DATA U8KL6962GDM2ET3Q2IA8C9SKF8/65
 1020 DATA KD60JEO6KL6962GDC2ISP4PU15/59
 1030 DATA G9B0060J62G98AJM8UH8UC14NG/2E
 1040 DATA NU4TA7KA6J0FU06MH7EHT19546/54
 1050 DATA 4UA7KA6J097EET3Q4KO0C9D006/28
 1060 DATA 0MKABJ4RV0C0MK559GE9U10OID/56
 1070 DATA 00I40H248GGLSL003A23KTGGC5/0F
 1080 DATA 15L0KO70D5803ING1A80IK0AV0/06
 1090 DATA 59G03ABHGOIOG0N4558OE9F055/1E
 1100 DATA OQBG0KL1PIIOD8AC0GQ2G12A50/45
 1110 DATA 5N198632B059C6IQ0A2J0498K0/D8
 1120 DATA D9EMA8C9CU05A05Q19EMA82J18/17
 1130 DATA EC0H1MH9CMK56AA5KK0D954KIL/38
 1140 DATA 0GQ2H582K58G8IH82MEULQ51K6/43
 1150 DATA OSDA4T6RKA2ODH4QK0E00BHIIL/78
 1160 DATA 34P017AAA4CJUO4M19F1IE5GRU/41
 1170 DATA 05V26Q32F1266Q32F12442U1A0/CD
 1180 DATA 0HPMGPQCKL8HP5P0K58GM7860K/78
 1190 DATA 0BRR0OH7GHE4O3205QUOQH1TRG/8A
 1200 DATA 8CR8A6AFGL8BCTJKOCN8L2IPC6/7F
 1210 DATA 4MU2GKO1B00H1MH98MIG1HH5G3/3F
 1220 DATA 1646EJ0BM2IPD8AC0KO08GR8KK/3A
 1230 DATA B980QIA99A34D5QP9A3J046GK9/1A
 1240 DATA BU51A424KA0LJNLEHCEJL2EJDQ/60
 1250 DATA 5H6EK0A035I6UUO649S49HE0OG/3F
 1260 DATA 1ENGA404EDK6FJ33A45MM1G5E0/08
 1270 DATA 246Q55069K02P08K50NS35G47Q/FF
 1280 DATA 15FG0I06H58A3IJO2LCL002U12/00
 1290 DATA F1264U24883S908CR82P9GMTO6/34
 1300 DATA 2AMK0757AQGGTBE0KVB603IKC0/3C
 1310 DATA 7585DD00EAE5L11QMO19SMC075/11
 1320 DATA 80EAHAHC4KL02GH26CKS2GL34/32
 1330 DATA N0K68L2K2GCG8L0P0HKR0Q3OD5/4F
 1340 DATA 46J1388H35954KIGKO8G8M78K4/1B
 1350 DATA 8HCLDTG7K1P9QHK6GRR8F8IS0A/94
 1360 DATA 2OCL82GN2HB04L8OR8C9S49G64/3E
 1370 DATA 0BTS236Q4L20CAD8D1K44K0PR1/22
 1380 DATA KL8GVM0502IU264M3UGJ398HIQ/64
 1390 DATA 008M78K6OOR8C9649I6K88TT9G/54
 1400 DATA N8O540276Q33E45LQ1L5O6GU39/28
 1410 DATA 91K48GMG0502IU264UOTKA3OD5/41
 1420 DATA 26F2EQ080E9E2L12431000400/AC
 1430 DATA 5007S001000F00007OGK2PA9C/CD
 1440 DATA 5C55O6GGT991A9J0SKJ61P96C3/30
 1450 DATA I561OG0VTHG1VQA3GNE407VCC0/61
 1460 DATA FS30PO4J1G6M15GA0OE9E2G6K5/31
 1470 DATA N23RG5VUAO211FVUIMS9FE0VVG/B3
 1480 DATA CQ20T200000000000000VTGIS8/C9
 1490 DATA DE0K08QBGCC027FVOJ1DNGDQVC/6D
 1500 DATA TBNEJRFBTVKEPQNET7MUNRV8TJ/2C
 1510 DATA LETQEO30C1G60030C9H64OJ2C9/33
 1520 DATA H64OB1C5GM2OTNKETQQOR3CDG8/9E
 1530 DATA 1O61G1P50G81ID0074M100825C/C4
 1540 DATA M146OK18832EHT1OJ3OBGE6291/21
 1550 DATA S19S0488KC8P44KH15G53KV1A0/20
 1560 DATA 851K0AAF9OIGHJCD0B1K4HMFP2/3A
 1570 DATA 0SK1ODPGMGNG61G0GSI116GU12/5A
 1580 DATA S3AE4S18I9EA8CKSB1PFPQ0AH0/59
 1590 DATA SCKB58L9H586GGSHD14E1QT22F/4E
 1600 DATA K0IKGPIDG9M071J45C0M9H4DC5/33
 1610 DATA 74MRQ0G3J2IH71OM1E33AETI08/3B
 1620 DATA VUC3HD1O02N2P044UH090E600A/15
 1630 DATA 620GJSK1UC0O5KCBGC1G60VJKE/55
 1640 DATA HQ7SO30C1V60030FPQ78T3UC1G/62
 1650 DATA 60VJ0C1G7SO30C1V7SO2000058/09
 1660 DATA QJ0FPG20T3041Q60VJ081L60G3/15
 1670 DATA AC1V6080000L78O2KFOV3SFHU7/40
 1680 DATA O27S7GU3OF1S7G6FOF1S7GU3OF/88
 1690 DATA 0CAGE1070S3G608C3G62O30S0G/FF
 1700 DATA 20070C10000003G62O2080000/6B
 1710 DATA 070C5G60G20800VTALALALALAV/29
 1720 DATA U0000000000010 40G2081042G3/57
 1730 DATA 0C1G60030C7G60030C1G60OF0C/D8
 1740 DATA 0G2081040GA0000000000000J/64
 1750 DATA VQLALALALALVVVALALALALANVG/F3
 1760 DATA 00000000000G3040120030 81G/5F
 1770 DATA 600G408260030C0108 0G4C1G20/8D
 1780 DATA O228116001000000000000000VU/82
 1790 DATA LALALALALFVVQLALALALALVS00/C4
```

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HATTRIX

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```
1800 DATA 00000001A00000000058L3U000/4E
1810 DATA 58VJUFPV7SL1A58L7SVJUFO02K/B9
1820 DATA 000002KVG000000000000L7VLA/9F
1830 DATA LALALALBVVULALALALALFV0000/98
1840 DATA 00000000G0000000G20C1G00G3/52
1850 DATA 0C1G6003041G60030C1G600000/97
1860 DATA 0G20810C0000000000001VTALA/8D
1870 DATA LALALAVVVLALALALALBVO0L2GA/BE
1880 DATA 1850H2000000AH8FHI6402KA1T/BE
1890 DATA 7GU34C800001A51U680G0AH87K/F3
1900 DATA U3OCHH0000000000000FVALALA/DD
1910 DATA LALANVVTALALALALAVU0000000/73
1920 DATA 0000K0000050K3OF1S0002GF1S/B2
1930 DATA 7GU3O0002GU3OF1S7G00000K2G/04
1940 DATA U3OF000000000000A3VQLALALA/EB
1950 DATA LALVVVALALALALANVG00000000/5D
1960 DATA 004000001048G24C8000032CHH/6E
1970 DATA 68OG000064P32CHH0000048G24/AE
1980 DATA 8320000000000024VULALALALA/CC
1990 DATA LFVVQLALALALALVS0AHA000000/6D
2000 DATA 007SVJU58000000AHV7SVJUFO0/54
2010 DATA 7SAJUFPV7SVG0FPV7SVIK00000/A6
2020 DATA 00058L000000007VLALALALALB/E4
2030 DATA VG000000000000002KAG000104/64
2040 DATA 8V3S7HU2GL580061030S0G4182/0D
2050 DATA 000G200000G240000000000000/28
2060 DATA G2480000000000000180000001/28
2070 DATA AAG02KL0059A082G40G50810A0/AD
2080 DATA 0000K00000008124000000000/23
2090 DATA 000000000000000000L2K00000/2B
2100 DATA 0007OV1SFGK000001GE0O70400/D0
2110 DATA 0000040G000000000000000000/14
2120 DATA 12400000000008 0000K000059A/3B
2130 DATA 2KL1AAGL5810A0G5082G418040/BD
2140 DATA 000A00000000H2000000000000/1D
2150 DATA 00000002401A5800000G00FHU3/6F
2160 DATA OV18AIK0030S1GE0820K100081/D6
2170 DATA 0000800000000000001280H20/26
2180 DATA A00000000000000000000L5801/2D
2190 DATA AAG02KL04182082G4005000000/99
2200 DATA 000000041240K0000000000000/1F
2210 DATA 00000000000000000000000000/00
2220 DATA 00000000000000000000000000/00
2230 DATA 00000000000000000000000000/00
2240 DATA 00000000000000000000000000/00
2250 DATA 00000000000000000000000000/00
2260 DATA 00000000000000000000000000/00
2270 DATA end
```

PICPAC

Listing 1

```
   10 REM Picpac Listing 12
   20 REM Fill Routine
   30 REM by James Richards
   40 REM for B/B+/M/C/E with ADFS
   50 REM (c) BBC Acorn User January 199
1
   60 :
   70 ON ERROR PROCerror
   80 PROCinit
   90 VDU7
  100 REPEAT
  110 PROCcrosshair
  120 IF INKEY(-38) THEN CHAIN"Icondrive
"
  130 IF INKEY(-55) THEN PROCsave
  140 IF INKEY(-1) THEN s%=64 ELSE s%=4
  150 IF INKEY(-98) THEN x%=x%-s%
  160 IF INKEY(-67) THEN x%=x%+s%
  170 IF INKEY(-105) THEN y%=y%-s%
  180 IF INKEY(-73) THEN y%=y%+s%
  190 IF INKEY(-74) THEN PROCfill
  200 IF INKEY(-26) THEN col%=col%-1:PRO
Cadjpall
  210 IF INKEY(-122) THEN col%=col%+1:PR
OCadjpall
  220 IF x%<0 THEN x%=0
  230 IF x%>1279 THEN x%=1279
  240 IF y%<36 THEN y%=36
  250 IF y%>1023 THEN y%=1023
  260 UNTIL INKEY(-113)
  270 :
  280 CHAIN"Bootstr"
  290 :
  300 DEF PROCfill
  310 GCOL 0,col%
  320 PLOT 77,x%,y%
  330 ENDPROC
  340 :
  350 DEF PROCcrosshair
  360 GCOL3,7
  370 FOR loop%=0 TO 1
  380 MOVE x%,y%+12
  390 DRAW x%,y%-12
  400 MOVE x%+12,y%
  410 DRAW x%-12,y%
  420 NEXT loop%
  430 ENDPROC
  440 :
  450 DEF PROCsave
  460 IF M%<3 THEN himem%=&3000
  470 IF M%>3 THEN himem%=&5800
  480 OSCLI "SAVE $."+STR$(M%)+".Wkfile
"+STR$~(himem%)+" 8000"
  490 ENDPROC
  500 :
  510 DEF PROCinit
  520 *FX229,1
  530 *FX4,1
  540 VDU23;8202;0;0;0;
  550 x%=640
  560 y%=512
  570 col%=7
  580 PROCadjpall
  590 ENDPROC
  600 :
  610 DEF PROCadjpall
  620 IF col%>15 THEN col%=0
  630 IF col%<0 THEN col%=15
  640 VDU24,0;0;1279;32;
  650 GCOL0,128+col%
  660 CLG
  670 VDU26
  680 PROCdelay
  690 GCOL0,128
  700 ENDPROC
  710 :
  720 DEF PROCdelay
  730 NOW=TIME
  740 REPEAT UNTIL TIME-NOW>50
  750 ENDPROC
  760 :
  770 DEF PROCerror
  780 VDU6
  790 VDU28,0,31,19,30
  800 CLS
  810 PRINT"An error has occuredSave scr
een (Y/N)";
  820 REPEAT
  830 *FX15,0
  840 key$=GET$
  850 UNTIL INSTR("YN",key$)>0
  860 IF key$="N" THEN GOTO880
  870 OSCLI"Save $."+STR$-M%+".Emergency
3000 8000"
  880 VDU26
  890 CLS
  900 PRINT'''
  910 REPORT:PRINT;" at line ";ERL
  920 OSCLI "KEY 0 LIST "+STR$(ERL)+"|M"
  930 *FX138,0,128
  940 END
```

Listing 2

```
   10 REM Picpac Listing 13
   20 REM Look utility
   30 REM by James Richards
   40 REM for B/B+/M/C/E with ADFS
   50 REM (c) BBC Acorn User January 199
1
   60 :
   70 ON ERROR MODE6:PROCerror
   80 *FX15,0
   90 *FX229,0
  100 VDU23;8202;0;0;0;
  110 VDU 20
  120 REPEAT
  130 logical%=FNgetcol
  140 VDU7
  150 PROCdelay
  160 physical%=FNgetcol
  170 VDU7
  180 PROCdelay
  190 VDU 19,logical%,physical%;0;
  200 UNTIL FALSE
  210 :
  220 DEF FNgetcol
  230 REPEAT
  240 key$=GET$
  250 pos%=INSTR("0123456789ABCDEFR",key
$)
  260 UNTIL pos%>-1
  270 IF pos%>16 THEN RUN
  280 =pos%-1
  290 :
  300 DEF PROCdelay
  310 NOW=TIME
  320 REPEAT UNTIL TIME-NOW>50
  330 ENDPROC
  340 :
  350 DEF PROCerror
  360 IF ERR=17 THEN CHAIN"Menu"
  370 PRINT'''
  380 REPORT:PRINT;" at line ";ERL
  390 PRINT''
  400 OSCLI "KEY 0 LIST "+STR$(ERL)+"|M"
  410 *FX 138,0,128
  420 END
```

Listing 3

```
   10 REM Picpac Listing 14
   20 REM Partsave Routine
   30 REM by James Richards
   40 REM for B/B+/M/C/E with ADFS
   50 REM (c) BBC Acorn User January 199
1
   60 :
   70 ON ERROR MODE 6:PROCerror
   80 MODE M%
   90 REPEAT
  100 PROCinit
  110 PROCgetblock
  120 PROCsaveblock
  130 UNTIL FALSE
  140 :
  150 DEF PROCinit
  160 *FX15,0
  170 *FX229,0
  180 VDU23;8202;0;0;0;
  190 start%=31*32
  200 end%=32
  210 IF M%<3 THEN sw%=&280
  220 IF M%>3 THEN sw%=&140
  230 OSCLI "Load $."+STR$(M%)+".wkfile"
  240 VDU 28,0,31,19,31
  250 CLS
  260 INPUT"Filename "file$
  270 IF file$="" THEN PROCend
  280 PROCcheck
  290 ENDPROC
  300 :
  310 DEF PROCgetblock
  320 REPEAT
  330 IF INKEY(-105) THEN end%=end%-32
  340 IF INKEY(-73) THEN end%=end%+32
  350 IF INKEY(-98) THEN start%=start%-3
2
  360 IF INKEY(-66) THEN start%=start%+3
2
  370 PROClines
  380 UNTIL INKEY(-74)
  390 :
  400 bott%=&8000-(sw%*(end% DIV 32))
  410 top%=&8000-(sw%*(start% DIV 32))
  420 rbott%=bott%
  430 rtop%=top%
  440 IF top%>bott% THEN bott%=rtop%:top
%=rbott%
  450 :
  460 ENDPROC
  470 :
  480 DEF PROClines
  490 GCOL3,7
  500 FOR loop%=0 TO 1
  510 MOVE 0,start%:DRAW 1279,start%
  520 MOVE 0,end%:DRAW 1279,end%
  530 NEXT loop%
  540 ENDPROC
  550 :
  560 DEF PROCsaveblock
  570 OSCLI "SAVE $."+STR$(M%)+"."+file$
+" "+STR$~(top%)+" "+STR$~(bott%)
  580 ENDPROC
  590 :
  600 DEF PROCcheck
  610 IF LEN(file$)>10 THEN PRINT"Too lo
ng.":PROCdelay:RUN
  620 file%=OPENIN file$
  630 len%=EXT#file%
  640 CLOSE #0
  650 IF len%>0 THEN PROCquestion:ENDPRO
C
  660 ENDPROC
  670 :
  680 DEF PROCquestion
  690 PRINT"File exists.Cont.?";
  700 *FX15,0
  710 key$=GET$
  720 IF key$<>"Y" THEN RUN
  730 ENDPROC
  740 :
  750 DEF PROCend
  760 CHAIN"Menu"
  770 :
  780 DEF PROCdelay
  790 NOW=TIME
  800 REPEAT UNTIL TIME-NOW>100
  810 ENDPROC
  820 :
  830 DEF PROCerror
  840 IF ERR=17 THEN PROCend
  850 PRINT'''
  860 REPORT
  870 PRINT;" at line ";ERL
  880 OSCLI "KEY 0 LIST "+STR$(ERL)+"|M"
  890 *FX 138,0,128
  900 END
```

Listing 4

```
   10 REM Picpac Listing 15
   20 REM Printer Dump
   30 REM by James Richards
   40 REM for B/B+/M/C/E
   50 REM (c) BBC Acorn User January 199
1
   60 :
   70 ON ERROR MODE 0:PROCerror
   80 PROCass
   90 MODE M%
  100 PROCcoff
  110 PROCload
  120 PROCclearbottom
  130 PROCdump
  140 CHAIN"Menu"
  150 :
  160 DEF PROCcoff
  170 VDU 23;8202;0;0;0;
  180 ENDPROC
  190 :
  200 DEF PROCload
  210 OSCLI "Load $."+STR$(M%)+".wkfile"
  220 ENDPROC
  230 :
  240 DEF PROCclearbottom
  250 VDU 24,0;0;1279;32;
  260 GCOL 0,128
  270 CLG
  280 VDU 26
  290 ENDPROC
  300 :
  310 DEF PROCdump
  320 CALL &900
  330 ENDPROC
  340 :
  350 DEF PROCdelay
  360 NOW=TIME
  370 REPEAT UNTIL TIME-NOW>50
  380 ENDPROC
  390 :
  400 DEF PROCass
  410 FOR pass=0 TO 2 STEP 2
  420 P%=&900
  430 [OPT pass
  440 LDA #&02:JSR &FFEE
  450 LDA #&FF:STA &72
  460 LDA #&03:STA &73
  470 LDA #27:JSR send
  480 LDA #65:JSR send
  490 LDA #8:JSR send
  500 :
  510 .feed
  520 LDA #0
  530 STA &70:STA &71
  540 LDA #&1B:JSR send
  550 LDA #&4B:JSR send
  560 LDA #&40:JSR send
  570 LDA #&01:JSR send
  580 :
  590 .advance
  600 LDA #&08
  610 STA &76
  620 :
  630 .getstate
  640 LDX #&70:LDY #&00
  650 LDA #&09:JSR &FFF1
  660 CLC:LDA &74
  670 BEQ set
  680 SEC
  690 :
  700 .set
  710 ROL &75:LDA &72
  720 SEC:SBC #&04
  730 STA &72
  740 BCS columnend
  750 DEC &73
  760 :
  770 .columnend
  780 DEC &76:LDA &76
  790 BNE getstate
  800 LDA &75
  810 JSR send
  820 CLC:LDA #&04
  830 ADC &70:STA &70
  840 BCC lineend
  850 INC &71
  860 :
  870 .lineend
  880 LDA &71:CMP #&05
  890 BEQ endline
  900 LDA #&20:CLC
  910 ADC &72:STA &72
  920 BCC advance
  930 INC &73
  940 BCS advance
  950 :
  960 .endline
  970 LDA #10
  980 JSR send
  990 :
 1000 .checkend
 1010 LDA &73
```

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PICPAC

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```
1020 BMI end
1030 JMP feed
1040 :
1050 .end
1060 LDA #27:JSR send
1070 LDA #64:JSR send
1080 LDA #3:JSR &FFEE
1090 RTS
1100 :
1110 .send
1120 PHA
1130 LDA #&01:JSR &FFEE
1140 PLA:JSR &FFEE
1150 RTS
1160 ]
1170 NEXT pass
1180 ENDPROC
1190 :
1200 DEF PROCerror
1210 IF ERR=17 THEN CHAIN"Menu"
1220 PRINT'''
1230 REPORT:PRINT;" at line ";ERL
1240 PRINT''
1250 OSCLI "KEY Ø LIST "+STR$(ERL)+"|M"
1260 *FX 138,Ø,128
1270 END
```

Listing 5

```
  1Ø REM Picpac Listing 16
  2Ø REM Set user program
  3Ø REM by James Richards
  4Ø REM for B/B+/M/C/E with ADFS
  5Ø REM (c) BBC Acorn User January 199
1
  6Ø :
  7Ø ON ERROR PROCerror
  8Ø MODE 4
  9Ø *FX15,Ø
 1ØØ *FX229,Ø
 11Ø PRINT''
 12Ø *DIR $.UserProgs
 13Ø *.
 14Ø PRINT''
 15Ø INPUT"Set to utility : "file$
 16Ø IF LEN(file$)>1Ø THEN GOTO 15Ø
 17Ø IF LEN(file$)=Ø THEN PROCend
 18Ø file%=OPENIN file$
 19Ø len%=EXT#file%
 2ØØ CLOSE #file%
 21Ø IF len%=Ø THEN PRINT"File does not
exist.":PROCdelay:RUN
 22Ø $&9ØA=file$
 23Ø PROCend
 24Ø :
 25Ø DEF PROCdelay
 26Ø NOW=TIME
 27Ø REPEAT UNTIL TIME-NOW>2ØØ
 28Ø ENDPROC
 29Ø :
 3ØØ DEF PROCend
 31Ø *DIR $.PicPac
 32Ø CHAIN"Menu"
 33Ø :
 34Ø DEF PROCerror
 35Ø IF ERR=17 THEN PROCend
 36Ø CLS
 37Ø PRINT'''
 38Ø REPORT:PRINT;" at line ";ERL
 39Ø PRINT''
 4ØØ OSCLI "KEY Ø LIST "+STR$(ERL)+"|M"
 41Ø *FX 138,Ø,128
 42Ø END
```

Listing 6

```
  1Ø REM Picpac Listing 17
  2Ø REM User Link
  3Ø REM by James Richards
  4Ø REM for B/B+/M/C/E with ADFS
  5Ø REM (c) BBC Acorn User January 199
1
  6Ø :
  7Ø ON ERROR MODE 6:PROCerror
  8Ø MODE 4
  9Ø IF $&9ØA="" THEN PROCnotset
 1ØØ I%=FALSE
 11Ø *DIR $.UserProgs
 12Ø CHAIN $&9ØA
 13Ø :
 14Ø DEF PROCnotset
 15Ø PRINT'''
 16Ø PRINT"User Icon not set."
 17Ø NOW=TIME
 18Ø REPEAT UNTIL TIME-NOW>2ØØ
 19Ø CHAIN"Menu"
 2ØØ :
 21Ø DEF PROCerror
 22Ø PRINT'''
 23Ø REPORT
 24Ø PRINT;" at line ";ERL
 25Ø OSCLI "KEY Ø LIST "+STR$(ERL)+"|M"
 26Ø *FX 138,Ø,128
 27Ø END
```

Listing 7

```
  1Ø REM Load WorkFile
  2Ø REM PicPac Listing 8
  3Ø REM by James Richards
  4Ø REM for B/B+/M/C/E
  5Ø REM (c) BBC Acorn User January 199
1
  6Ø :
  7Ø *FX229,1
  8Ø ON ERROR MODE6:PROCerror
  9Ø MODE M%
 1ØØ PROCcoff
 11Ø PROCload
 12Ø PROCclearbottom
 13Ø I%=TRUE
 14Ø CHAIN $&9ØA
 15Ø :
 16Ø DEF PROCload
 17Ø OSCLI "LOAD $."+STR$(M%)+".wkfile"
 18Ø ENDPROC
 19Ø :
 2ØØ DEF PROCcoff
 21Ø VDU23;82Ø2;Ø;Ø;Ø;
 22Ø ENDPROC
 23Ø :
 24Ø DEF PROCclearbottom
 25Ø GCOLØ,128
 26Ø VDU24,Ø;Ø;1279;32;
 27Ø CLG
 28Ø VDU26
 29Ø ENDPROC
 3ØØ :
 31Ø DEF PROCerror
 32Ø PRINT'''
 33Ø *FX15,Ø
 34Ø REPORT
 35Ø PRINT;" at line ";ERL
 36Ø OSCLI "KEY Ø LIST "+STR$(ERL)+"|M"
 37Ø *FX 138,Ø,128
 38Ø END
```

Listing 8

```
  1Ø REM Picpac Listing 18
  2Ø REM Rerun
  3Ø REM by James Richards
  4Ø REM for B/B+/M/C/E
  5Ø REM (c) BBC Acorn User January 199
1
  6Ø :
  7Ø ON ERROR PROCerror
  8Ø PROCsave
  9Ø *FX2Ø2,128,111
 1ØØ *DIR $.Picpac
 11Ø CHAIN"Menu"
 12Ø :
 13Ø DEF PROCsave
 14Ø IF M%<3 THEN himem%=&3ØØØ
 15Ø IF M%>3 THEN himem%=&58ØØ
 16Ø OSCLI "SAVE $."+STR$(M%)+".wkfile
"+STR$~(himem%)+" 8ØØØ"
 17Ø ENDPROC
 18Ø :
 19Ø DEF PROCerror
 2ØØ VDU26,28,Ø,31,19,31
 21Ø PRINT"ERROR !!";
 22Ø NOW=TIME
 23Ø REPEAT UNTIL TIME-NOW>2ØØ
 24Ø PRINT"Insert spare disc";
 25Ø *FX15,Ø
 26Ø key$=GET$
 27Ø *MOUNT
 28Ø OSCLI "SAVE Emergency 3ØØØ 8ØØØ"
 29Ø VDU26
 3ØØ CLS
 31Ø REPORT
 32Ø PRINT;" at line ";ERL
 33Ø END
```

Listing 9

```
  1Ø REM Picpac Listing 19
  2Ø REM Super Text
  3Ø REM by James Richards
  4Ø REM for B/B+/M/C/E with ADFS
  5Ø REM (c) BBC Acorn User January 199
1
  6Ø :
  7Ø IF I%=FALSE THEN CHAIN"WkLoad"
  8Ø :
  9Ø PROCinit
 1ØØ REPEAT
 11Ø PROCgetsquare
 12Ø PROCtext
 13Ø x%=x%(Ø):y%=y%(Ø)
 14Ø x1%=x%(1):y1%=y%(1)
 15Ø x2%=x%(2):y2%=y%(2)
 16Ø x3%=x%(3):y3%=y%(3)
 17Ø PROCbox
 18Ø IF clearbox%=TRUE GCOLØ,bcol%:PROC
clearspace
 19Ø IF leavebox%=TRUE GCOL3,7:PROCbox
 2ØØ IF cornerbox%=TRUE PROCcorners
 21Ø readx%=Ø
 22Ø ready%=Ø
 23Ø REPEAT
 24Ø REPEAT
 25Ø IF POINT(pix%*readx%,28-(4*ready%)
)<>Ø GCOLØ,fcol%:PROCsquare(readx%,ready
%,textx%,8)
 26Ø readx%=readx%+1
 27Ø UNTIL readx%=textx%
 28Ø readx%=Ø
 29Ø ready%=ready%+1
 3ØØ UNTIL ready%=8
 31Ø UNTIL FALSE
 32Ø :
 33Ø DEF PROCcalpoint(pos%,pos1%,stepx%
,stepy%)
 34Ø px=(x3%+((x2%-x3%)/stepx%)*pos%)-(
((x3%+((x2%-x3%)/stepx%)*pos%)-(x%+((x1%
-x%)/stepx%)*pos%))/stepy%)*pos1%
 35Ø py=(y3%+((y2%-y3%)/stepx%)*pos%)-(
((y3%+((y2%-y3%)/stepx%)*pos%)-(y%+((y1%
-y%)/stepx%)*pos%))/stepy%)*pos1%
 36Ø ENDPROC
 37Ø :
 38Ø DEF PROCsquare(sx%,sy%,dud%,dud1%)
 39Ø IF points%=TRUE PROCcalpoint(sx%,s
y%,dud%,dud1%):PLOT 69,px,py:ENDPROC
 4ØØ PROCcalpoint(sx%,sy%,dud%,dud1%)
 41Ø sqx%=px
 42Ø sqy%=py
 43Ø PROCcalpoint(sx%+1,sy%,dud%,dud1%)
 44Ø sqx1%=px
 45Ø sqy1%=py
 46Ø PROCcalpoint(sx%,sy%+1,dud%,dud1%)
 47Ø sqx2%=px
 48Ø sqy2%=py
 49Ø PROCcalpoint(sx%+1,sy%+1,dud%,dud1
%)
 5ØØ sqx3%=px
 51Ø sqy3%=py
 52Ø IF outline%=TRUE GCOLØ,fcol%:PROCf
illedsquare:GCOLØ,bcol%:PROCemptysquare:
ENDPROC
 53Ø IF filled%=TRUE GCOLØ,fcol%:PROCfi
lledsquare
 54Ø IF filled%=FALSE GCOLØ,fcol%:PROCe
mptysquare
 55Ø ENDPROC
 56Ø :
 57Ø DEF PROCfilledsquare
 58Ø MOVEsqx%,sqy%
 59Ø MOVEsqx1%,sqy1%
 6ØØ PLOT85,sqx2%,sqy2%
 61Ø MOVEsqx2%,sqy2%
 62Ø MOVEsqx1%,sqy1%
 63Ø PLOT85,sqx3%,sqy3%
 64Ø ENDPROC
 65Ø :
 66Ø DEF PROCemptysquare
 67Ø MOVEsqx%,sqy%
 68Ø DRAWsqx1%,sqy1%
 69Ø DRAWsqx3%,sqy3%
 7ØØ DRAWsqx2%,sqy2%
 71Ø DRAWsqx%,sqy%
 72Ø ENDPROC
 73Ø :
 74Ø DEF PROCgetsquare
 75Ø PROCgetpoint(Ø)
 76Ø PROCgetpoint(1)
 77Ø PROCgetpoint(2)
 78Ø PROCgetpoint(3)
 79Ø ENDPROC
 8ØØ :
 81Ø DEF PROCgetpoint(array%)
 82Ø REPEAT
 83Ø IF INKEY(-1) sx%=32:sy%=32 ELSE sx
%=pix%:sy%=4
 84Ø GCOL3,7
 85Ø PROCline
 86Ø PROCline
 87Ø IF INKEY(-73) cory%=cory%+sy%
 88Ø IF INKEY(-1Ø5) cory%=cory%-sy%
 89Ø IF INKEY(-67) corx%=corx%+sx%
 9ØØ IF INKEY(-98) corx%=corx%-sx%
 91Ø IF INKEY(-113) PROCend
 92Ø IF INKEY(-66) PROCattributes
 93Ø UNTIL INKEY(-74)
 94Ø PROCline
 95Ø VDU7
 96Ø PROCdelay(5Ø)
 97Ø x%(array%)=corx%
 98Ø y%(array%)=cory%
 99Ø ENDPROC
1ØØØ :
1Ø1Ø DEF PROCtext
1Ø2Ø *FX15,Ø
1Ø3Ø INPUT'"Text : "text$
1Ø4Ø IF text$="" PROCend
1Ø5Ø textx%=LEN(text$)*8
1Ø6Ø PRINT'text$;
1Ø7Ø ENDPROC
1Ø8Ø :
1Ø9Ø DEF PROCline
11ØØ PLOT 69,corx%,cory%
111Ø IF array%=Ø ENDPROC
112Ø MOVE x%(array%-1),y%(array%-1)
113Ø PLOT21,corx%,cory%
114Ø IF array%=3 THEN PLOT21,x%(Ø),y%(Ø
)
115Ø ENDPROC
116Ø :
117Ø DEF PROCinit
118Ø *FX229,1
119Ø IF M%=Ø pix%=2
12ØØ IF M%=1 OR M%=4 pix%=4
121Ø IF M%=2 OR M%=5 pix%=8
122Ø corx%=64Ø
123Ø cory%=512
124Ø VDU28,Ø,31,19,31
125Ø DIM x%(3),y%(3)
126Ø fcol%=7
127Ø bcol%=Ø
128Ø clearbox%=FALSE
129Ø filled%=TRUE
13ØØ leavebox%=FALSE
131Ø cornerbox%=FALSE
132Ø points%=FALSE
133Ø outline%=FALSE
134Ø ENDPROC
135Ø :
136Ø DEF PROCclearspace
137Ø MOVEx%,y%
138Ø MOVEx1%,y1%
139Ø PLOT85,x2%,y2%
14ØØ MOVEx3%,y3%
141Ø PLOT85,x%,y%
142Ø ENDPROC
143Ø :
144Ø DEF PROCattributes
145Ø VDU7
146Ø PRINT'"Set attributes.";
147Ø PROCdelay(1ØØ)
148Ø *FX15,Ø
149Ø INPUT'"Forground "fcol%
15ØØ INPUT'"Background "bcol%
151Ø IF bcol%<>Ø clearbox%=TRUE:GOTO 15
4Ø
152Ø PRINT"Clear box";
153Ø clearbox%=FNyn
154Ø PRINT'"Points";
155Ø points%=FNyn
156Ø IF points%=TRUE THEN 162Ø
157Ø PRINT'"Outlined";
158Ø outline%=FNyn
159Ø IF outline%=TRUE THEN 162Ø
16ØØ PRINT'"Filled";
161Ø filled%=FNyn
162Ø PRINT'"Leave Box";
163Ø leavebox%=FNyn
164Ø IF leavebox%=TRUE corners%=FALSE:G
OTO 167Ø
165Ø PRINT'"Corner box";
166Ø cornerbox%=FNyn
167Ø ENDPROC
168Ø :
169Ø DEF PROCdelay(time%)
17ØØ NOW=TIME
171Ø REPEAT UNTIL TIME-NOW>time%
172Ø ENDPROC
173Ø :
174Ø DEF FNyn
175Ø *FX 15,Ø
176Ø key$=GET$
177Ø IF key$="Y"=TRUE
178Ø IF key$="N"=FALSE
179Ø VDU7:GOTO 175Ø
18ØØ :
181Ø DEF PROCbox
182Ø MOVEx%,y%
183Ø PLOT29,x1%,y1%
184Ø PLOT29,x2%,y2%
185Ø PLOT29,x3%,y3%
186Ø PLOT29,x%,y%
187Ø ENDPROC
188Ø :
189Ø DEF PROCcorners
19ØØ PLOT69,x%(Ø),y%(Ø)
191Ø PLOT69,x%(1),y%(1)
192Ø PLOT69,x%(2),y%(2)
193Ø PLOT69,x%(3),y%(3)
194Ø ENDPROC
195Ø :
196Ø DEF PROCend
197Ø GCOLØ,Ø
198Ø MOVE x%(Ø),y%(Ø)
199Ø IF array%=Ø THEN 2Ø3Ø
2ØØØ FOR loop%=1 TO array%-1
2Ø1Ø DRAW x%(loop%),y%(loop%)
2Ø2Ø NEXT
2Ø3Ø *FX15,Ø
2Ø4Ø CHAIN"ReRUN"
2Ø5Ø :
2Ø6Ø DEF PROCerror
2Ø7Ø VDU6
2Ø8Ø VDU28,Ø,31,19,3Ø
2Ø9Ø CLS
21ØØ PRINT"An error has occuredSave scr
een (Y/N)";
211Ø REPEAT
212Ø *FX15,Ø
213Ø key$=GET$
214Ø UNTIL INSTR("YN",key$)>Ø
215Ø IF key$="N" THEN GOTO217Ø
216Ø OSCLI"Save $."+STR$~M%+".Emergency
3ØØØ 8ØØØ"
217Ø VDU26
218Ø CLS
219Ø PRINT'''
22ØØ REPORT:PRINT;" at line ";ERL
221Ø OSCLI "KEY Ø LIST "+STR$(ERL)+"|M"
222Ø *FX138,Ø,128
223Ø END
```

IMPRESSION II

Impression release 2 is the first major upgrade to the leading DTP package for the Archimedes. It makes the preparation of documents, from the simplest letters to the most complex and intricate designs, easier than it has ever been before. It is the only program designed to be used as a word processor, to handle long documents while at the same time offering the most powerful page layout facilities.

Where word processing and DTP meet

As word processors grow more powerful year by year, Desk-Top-Publishing programs are becoming more like word processors, so that both types of product are evolving in the same direction. However few computers have either the power or a flexible enough operating system to allow the successful integration of the two approaches.

Impression on the Archimedes has successfully combined the best features of word processors and desk-top-publishing programs to create the logical result of that evolution. A word processor that can handle the most complex DTP, and a DTP program that can process words like no other - we call it a document processor.

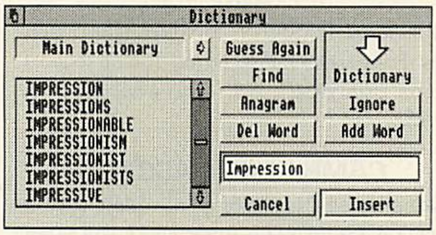
When other computers catch up with the Archimedes, all word processors will be like Impression. Why buy two programs when Impression can handle all your documentation requirements ?

Word processing

To be a successful word processor, a program has to be easy to use, include, amongst other things, real time spell checking, a powerful set of editing tools and the ability to handle documents from the simplest letter to complete books. What's more it has to be fast and responsive in use, something that lets down nearly all DTP programs.

Spelling checker

Spelling checkers have become a necessary tool in reducing errors in documents, not necessarily because they can catch spelling mistakes, but because they can also spot typing errors. The spelling checker supplied with Impression is based on the successful SpellMaster product, enhanced and fully integrated into Impression. It offers check-as-you-type, a 60,000 word main dictionary, up to 8 user extension dictionaries (which can automatically save themselves to disc) and two intelligent guess modes to help identify the correct word (one lists words that sound like the misspelt word, the other lists words based on the most common typing errors). It will even solve crossword and anagram puzzles.



The spelling checker dialogue

Long documents

Impression supports many features to aid the creation of long documents. By employing automatic disc slaving, it can handle documents of practically any size, even on 1Mbyte Archimedes. In fact, the memory available in the machine is no longer the limiting factor. Impression has already been used to produce books and manuals consisting of hundreds of pages, sometimes many megabytes long.

It also supports automatic index and contents compilation, again an enormous time saver. Impression 2 also has the ability to keep headings attached to the following paragraph, so eliminating 'widow' lines at the bottom of pages or columns. This improves the appearance of all documents, short or long.

As you might expect, automatic page and chapter numbering is supported along with the most flexible header and footer system around. These may be any number of lines at any position on the page, and even incorporate graphics. A new feature in Impression 2 allows headers and footers, or any frame, to repeat over a whole document or any specific range of pages.

Styles

Impression's unique style system can be a time saver for all types of word processing and DTP use. The appearance of headings, titles, quotes or any region of text can be made to appear in any combination of a vast range of stylistic effects. Each combination of effects can be given a name and applied to any required region of text with one key press. Styles save time because the combination of effects can be applied in one go rather than individually applying each effect, each time it is required.

Styles are retro-active - any edit or alteration performed to a style will affect all occurrences of that style in the text. For example, if all quotes in a document are set to be italicised, and you want to change them to be bold, this involves just a single style edit.

The Impression style system is unique in two ways; firstly in the number of options available - text can be any size (even as large as the page), any line spacing, any font, any colour (background or foreground). Text may be set to have a strikethrough line or be single or double underlined. Tabs can be leadered (it automatically puts dots between tabs). Paragraphs can have an

automatic ruling line placed after them (of any thickness and colour) etc etc.

Secondly, Impression styles can be applied to any region of text, from a single character to an entire document. They can also overlap, so that one style can be used in a paragraph while another is used for a few words in that paragraph. The above quote example is not possible on other DTP systems since they cannot apply a style to anything less than a paragraph.

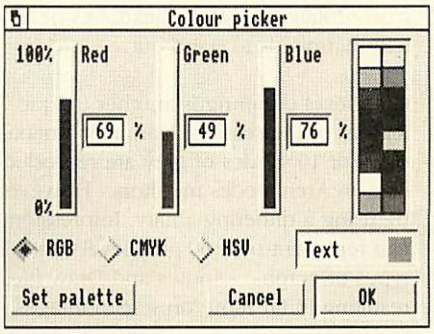
Master pages

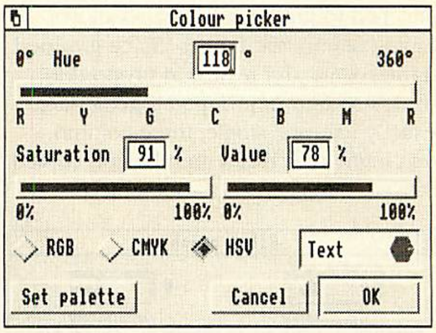
Impression master pages are a powerful tool that provides control over the appearance of a whole document. Master pages control the size, layout and structure of all pages in a document. If you want all pages to be based on three columns on A4 paper with a graphic in the corner, then the master page can be set to create all pages in this fashion automatically. However, master pages are really powerful because, like styles, they are retro-active. Any change made to a master page will be reflected throughout a document. So, if you decide to have two columns rather than three, or perhaps arrange the page landscape rather than portrait, this can be achieved by one master page change.

Impression supports any number of master pages (the pages can be any size) and can allow the page size to be changed *after* the document has been created.

Desk Top Publishing

All text and graphics are contained within rectangular frames. When using Impression as a word processor, these frames are created automatically on each new page, as the text flows from page to page. For desk-top-publishing work, the ability to place any frame at any position on the page gives absolute and total freedom of page design. Impression supports those features found in all good





The RGB colour selector (left) has a pre-selection of 16 colours, but allows any colour to be defined. Three alternative colour models are available, such as HSV shown on the right, which allows new colours to be selected in a more intuitive manner. These colour selectors can be used to set the colour of just about anything in Impression - text background and foreground, line and frame colours etc.

DTP programs such as the use of any font, any size. Frames of any size may be placed at any position on the page, and may be set to be transparent or opaque (any colour). By using the Acorn anti-aliased font system, it presents the ultimate in WYSIWYG displays. And since the scale of the page can be altered from 1% to 900% of actual size, it is possible to examine the page in enormous detail so that text of 1pt can be edited, or at smaller scales, complete page spreads can be viewed. Impression even allows more than one window, at different scales, on any document.

Impression also includes two essentials needed for any high quality, professional publishing, hyphenation and text grid-lock. The latter ensures that lines of text align across columns. Examine most quality newspapers or magazines and you will see that, even when pictures or different size headings are used, the main body text remains aligned across columns.

Hyphenation is of course used in virtually all printed material. This advert, magazines, books and all newspapers use hyphenation to improve the look and readability of text, especially when arranged in columns. Impression will hyphenate automatically if required, using a combination of exception dictionary and algorithmic hyphenation.

Users can add their own hyphenation points either manually in the text (using soft hyphens) or to words in the hyphenation exception dictionary.

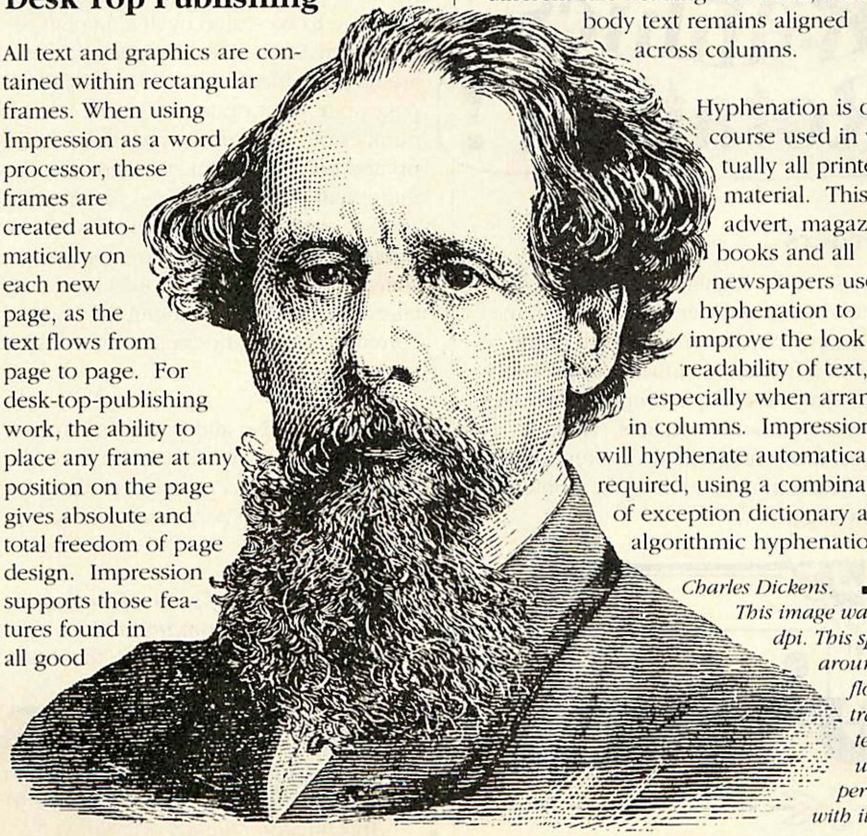
Frames

Since frames are a key part of Impression, a great deal of time has been spent ensuring that all possible frame manipulation tools are provided in a fashion that is convenient and simple to understand. Text frames can be connected to other text frames so that text will flow from frame to frame, in any desired order. (This can be displayed graphically, along with the number of words not fitting within a frame.) Any frame can be re-sized at will, and each frame can have independent repel margins. (Text can be made to repel around another frame, and the repel distance from any side of the frame can be controlled.) Text contained within a frame can also be inset from the frame edge by any amount.

Multiple frame operations

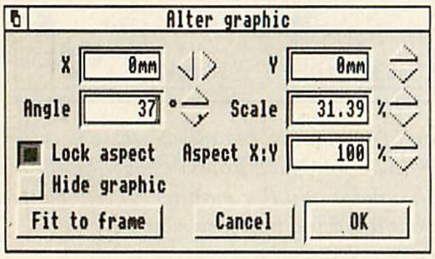
Any set of frames on a page can be temporarily selected together (multiple frame selection). In this mode the frames can be moved together as a group, and they can be copied to other pages or other documents. If one is re-sized, all others will change size by the same amount. (Imagine you want to make three columns slightly narrower - by selecting all three columns and changing the width of one, they will all change by the same amount.)

In addition frames can be permanently grouped, so captions can be permanently



Charles Dickens.
This image was scanned using the Scan-Light Junior scanner at 400 dpi. This sprite was re-touched using !Paint and a mask drawn around the head. Although Impression cannot automatically flow around irregular shapes, by placing a collection of transparent, but repelling, frames around the drawing, the text can be made to repel around any desired shape. By using the group frame facility, the repelling frames can be permanently tied to the drawing, so that the whole image with its repelling frames can be moved and scaled as one.

attached to graphics. This also allows multi-column text frames. Since grouped frames scale and re-size in proportion, three text frames grouped together act exactly like one single, three-column, text frame which can then be cut, copied, moved, dragged etc. as one object.



The Alter graphic dialogue allows precise numeric values to be entered.

Graphics

Either line art graphics (for example from !Draw) or bit-image graphics such as sprites, scanned or digitised images, can be placed in a frame. The graphics can be scaled, stretched, cropped as required, all instantaneously. Graphics can also be rotated by any angle, also instantaneously. And it can do all this without going near a dialogue box or menu option. Of course you can enter exact numeric scale or rotate values if required.

All graphics scale and rotate options are performed in real time - there is no delay or calculation required, and neither is the original graphic altered. So graphics can be scaled and rotated as much as you like without suffering cumulative distortion effects. Neither could it be simpler - by using the adjust mouse button, any graphic can be dragged around the centre of the frame, interactively. Speed tests indicate that rotation of sprite graphics is over 500 times faster than !Paint.

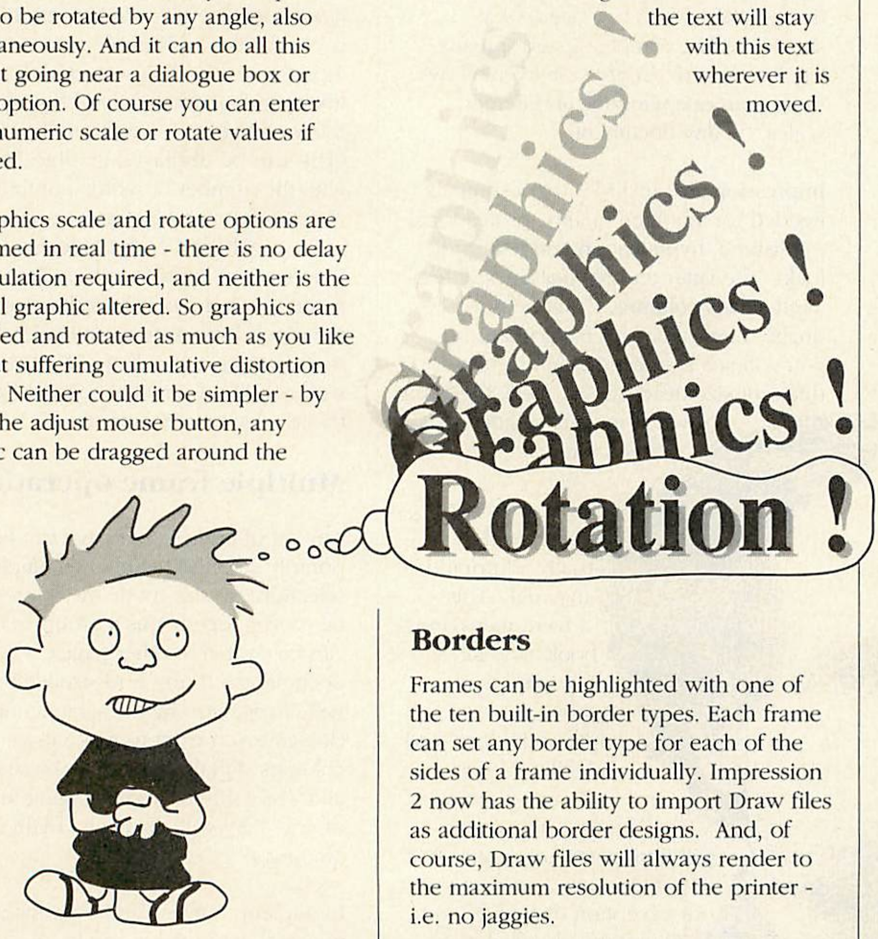
Although Impression cannot directly rotate text, it is supplied with a utility program that will convert lines of text into an outline graphic file. This can be dropped onto a frame where it can be freely rotated; ideal for headlines or any text that needs to stand out.

Grey level dithering is another unique feature of Impression. Normally a maximum of 16 shades of grey are reproducible on Archimedes monitors. However, by using a dithering ability, Impression can represent over 60 grey levels, for all types of graphic - sprites and Draw files, resulting in far more on screen images.

Flowing graphics in text

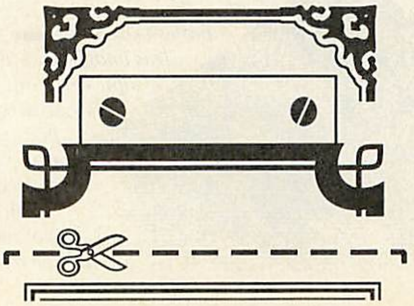
$$x_i = \sum_{k=1}^{n} t_i + m + \frac{A - Bc}{c + d} - y$$

Any document more than a few pages long, that contains graphics, usually requires the graphics to be tied to a particular part of the text. Impression can embed any graphic into the text, even as part of a line if required. For example, the above equation (from our Equasor program) embedded into the text will stay with this text wherever it is moved.



Borders

Frames can be highlighted with one of the ten built-in border types. Each frame can set any border type for each of the sides of a frame individually. Impression 2 now has the ability to import Draw files as additional border designs. And, of course, Draw files will always render to the maximum resolution of the printer - i.e. no jaggies.



Printing

Impression has always had a very wide range of printing options. Impression 2 takes this even further by supporting two completely different modes of operation - draft printing and RISC OS printing.

Word processors typically use the built in character set of the printer - this is fast and ideal for text only documents. DTP programs, on the other hand, use the RISC OS printer drivers that can deliver an exact representation of the page, including all fonts and graphics, to the maximum resolution of the printer. Unfortunately RISC OS printing can typically take 5 or more minutes per page on most dot-matrix printers. (PostScript or direct drive laser printers are the exception to this rule.)

Impression 2 supports both modes. Draft mode allows any document to be printed using the built-in character set of the printer, matching the closest fonts available in the printer to those used on screen. This can be used for obtaining a quick text draft of any document - even complex DTP layouts. If Impression is being used as a text only word processor, this mode is fast and accurate while still allowing full control over printer attributes such as bold, italic, underlining etc. This mode even allows multi-column text, multi-line headers and footers etc and so means that Impression is now a truly effective alternative to traditional character mode word processors such as First Word Plus.

RISC OS printing in Impression allows the page to be scaled by any amount or rotated by 90 degrees. Unique features are its pamphlet mode and multiple pages per sheet options. This allows any number of scaled down pages to be printed on a single sheet - useful for thumbnail printing and vital for proofing since it means that A4 documents can be printed 2 up, as A5 pages on a single sheet of paper. The pamphlet mode takes this further by printing the pages correctly rotated and arranged for folding into a pamphlet.

Impression 2 also allows any number of copies of a page to be fitted on each sheet and reflected printing (professional typeset pages can be printed emulsion side down.)

Some examples of some of the frame borders possible from Impression. You can also design your own with !Draw.

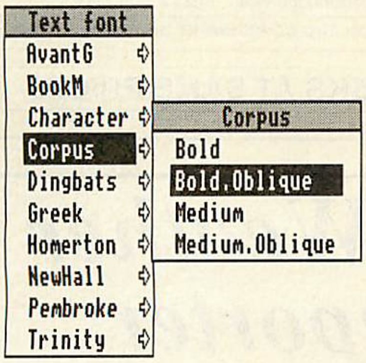
Needless to say, this document was created, arranged, edited and typeset entirely with Impression 2 on a 2Mbyte Archimedes. Line-art originated from

Word substitution

Another unique Impression feature is word substitution or abbreviation expansion - as you type. Any commonly used word or phrase can be assigned any abbreviation and added to a dictionary. When the abbreviation is subsequently entered, it is automatically changed to the fully expanded word or phrase.

Ease of use

Much of the design effort for Impression has gone into the user interface. The program has the minimum of menu options (only 6 main menu items), so new users are not overwhelmed by dozens of menus. Full use is made of dialogue boxes which can remain on screen while editing continues. For example the 'Alter graphic' dialogue, illustrated opposite, will remain on screen and dynamically indicate any alterations performed to the graphic with the mouse. The result is that, although Impression is more powerful than any alternative, it is actually simpler to learn and easier to use.



Fonts are listed by family so reducing the size of menu and making it easier to select any required weight.

RISC OS

Impression is totally RISC OS compatible and follows the Acorn RISC OS guidelines. It integrates with other programs and supports in-memory transfer with co-operating applications. For example importing a picture from !Paint, !Draw or ScanLight involves simply dropping the appropriate icon onto a blank frame in an Impression window.

Impression can access the full RISC OS character set that includes a complete set of European characters. European versions (with translated manuals, menus etc) are available.

!Draw. The scanned image was obtained using Scan-Light Junior. Proofs were produced on a LaserDirect printer (90 seconds for all 4 pages).

The IMPRESSION family

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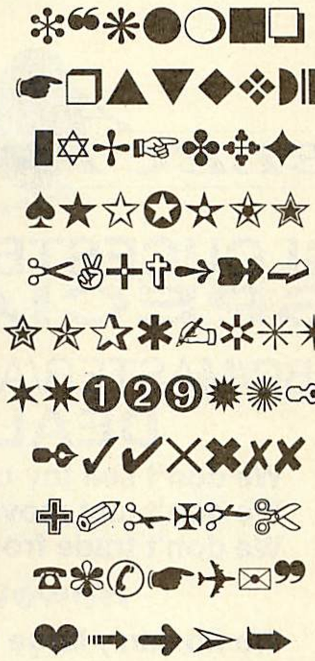
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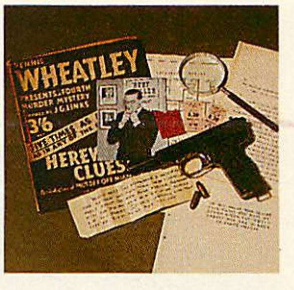


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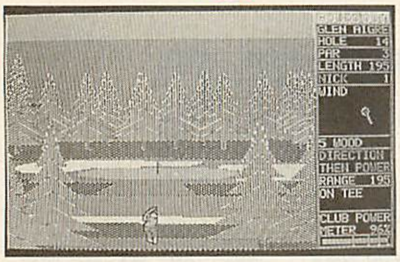
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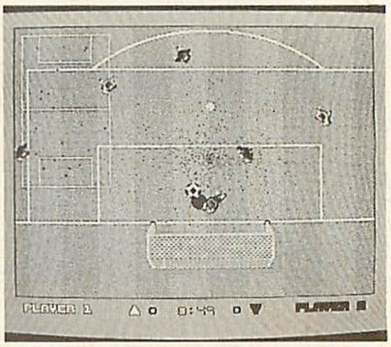
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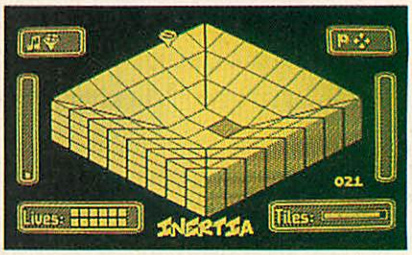
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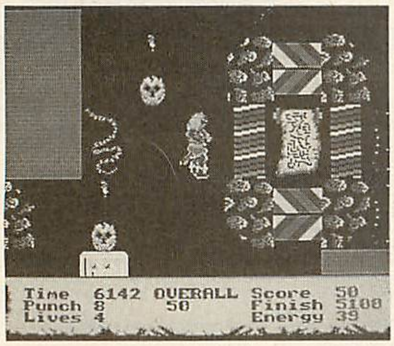
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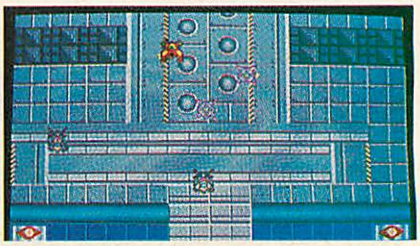
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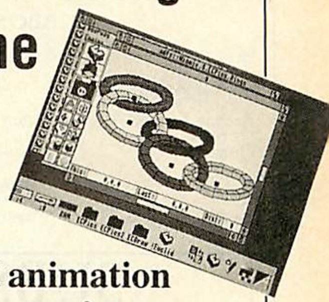
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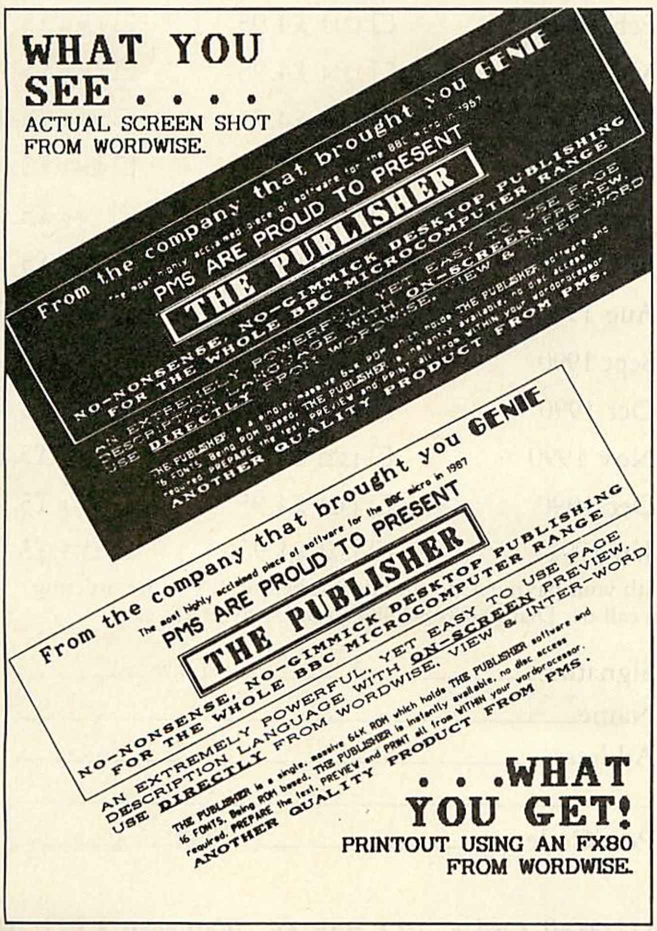




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IN-CREASED DELIGHT

Most 3D work on the Archimedes is restricted to depicting shapes on-screen. Tabs aims to change that by converting the screen image to a true paper model. **SIMON WILLIAMS** digs out the glue and scissors

'The trouble with computing is that it's so intangible. All these ephemeral images floating round the screen, there's no way of producing anything solid.' Thus runs one of the many lines taken against the use of computers, but there's now at least one program designed specifically to take the Archimedes into true three dimensional model creation.

Tabs is a 3D modelling tool with a difference; it takes the finished form and unfolds into one or more 'nets' on sheets of paper. A net is the flattened image of a 3D form like a cube, cylinder or cone.

The printed output from the program comes as pages of flat outlines, complete with score marks and tabs, after which the program is named.

The outlines can be cut out, folded up and glued to produce three dimensional models which have been entirely designed on the screen of an Arc. Anyone who has ever made up a traction engine out of a model book or cut a castle off the back of a pack of cornflakes will be very familiar with this creasing technique.

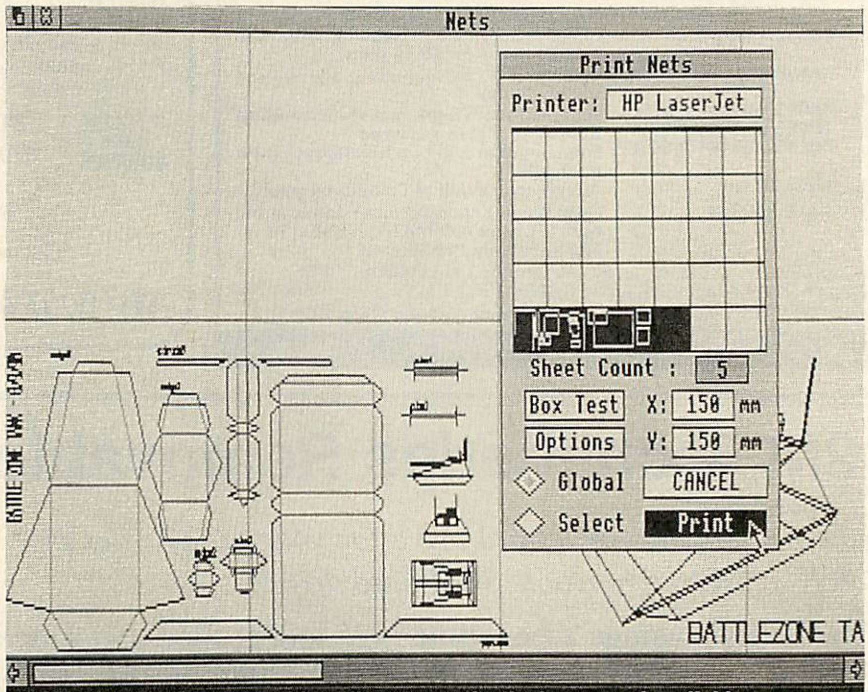
Multiple windows

The program is supplied on a single disc and runs happily from floppy or hard disc on any Arc with at least 1Mb of memory. The package includes two manuals: a reference for the program and a tutorial on model making. Both are reasonably produced, although there's an air of yesteryear about the layout and the inkjet type gets a bit fuzzy in places.

Once installed on the icon bar in typical Risc OS fashion – *Tabs* is a fully Risc OS program – you can start the application by dragging the icon of a model onto the *Tabs* icon or by double clicking on *Tabs* directly, to start from scratch.

Two windows then open: the Edit window and the Toolbox. The edit window shows each object that you create in orthographic projection, the front view by default.

A pair of crosshairs, tabulated with coordinates in whatever units are set, moves around the edit window as you move the mouse pointer over it.



The net window lets you position all nets to make the best use of available paper

It's useful to be able to expand the edit window out to full screen, as working at the default size can feel very cramped. The system of viewing in the edit window is not always ideal, either.

Although the program flicks the model from one plane to another automatically as you create an object, it's easy to mistake which plane you're viewing.

It also seems impossible to flick quickly to any of the three main planes. Your own spatial abilities have got to be good, if you're going to be able to visualise a model from its 'technical drawing'.

The problem of visualisation is partly alleviated by the View window. This is the third *Tabs* window and provides a good viewer for the current assembly. Using the mouse, you can pan the model around all three axes with a control system similar to that of the lander in *Zarch*.

The edit and view windows can be zoomed to show a model enlarged or reduced on screen and objects can be rescaled within the edit window to change their relative sizes.

There is also the facility to show the assembly in perspective, and you can alter the position of the 'camera' to change the apparent distance of the object from the viewer and the degree of zoom.

The view window can show wireframes or fully tinted solids, complete with hidden line removal. You can select a palette for the tints, too.

The palette, and most of the other tools within the program, are selected from the toolbox.

This window includes icons for the six major types of object that can be created: cube, cylinder, truncated cone, wedge, cone and extrusion.

The development of each is pretty simple. You fix the first point of the object and then stretch it out in the first plane. As soon as you fix the final corner, the program flicks you into the third dimension to specify the object's depth and position in relation to other objects in the assembly.

It would be useful to be able to flick between the three perpendicular planes at any time.

Although it is possible to do this, the functions are buried a couple of levels down the menu structure and require the setting of rotation angles before use.

Another problem lies in the reproduction of extrusions in the view window.

The algorithm used for this type of object is barely slower than any of the fixed-shape formulae, but it does result in some facets of the extrusion, particularly the end-faces, showing up intermittently when in the view window.

The final window available under *Tabs* is for the nets themselves. As you create your objects in the edit window you can lay them down on a notional sheet of paper as a flattened out 'net'.

The size of the paper will depend on the printer or plotter you've selected for output, but you're almost bound to need to rearrange the nets in order to get the best fit per sheet.

The original review version of *Tabs* would only let you place a net once, when it was fixed for good. The current revision rectifies this deficiency, and you can now pick and place any net at will, rotating it as necessary through any angle to achieve a best fit, and thus economise on the amount of paper used. Just as well, if you value the life of the Scandinavian pine forests!

Output options

Tabs supports several popular devices for output. In addition to the PlotMate A3M plotter and any HPGL device, it can print to any device with a Risc OS driver and to several disc file types as well. If you're using a Risc OS driver, you do have to remember to load this before running *Tabs*, though, as the program detects the driver once only, at load time. Compatibility with other Archimedes programs is good, and you can save a model as a *!Draw* file or for use in ExpLan's sister product, *Arcol*.

It can also be output as a series of VDU codes, suitable for loading into *LinCAD*. A converter is available to transfer *Tabs* images to the *Euclid* 3D drawing package.

The layout of nets on paper is not that simple. You have to allow for the border outside which a laser printer can't print, for example, and the sample models supplied with the package are laid out for a plotter. You have to rearrange the nets before you can use them for A4 printing.

The Net window shows where each net is placed and the print menu shows all the sheets together at reduced size, so you can print the lot or select specific sheets.

Printing starts with the bottom left-hand corner sheet and progresses to the right and up. This is an unconventional layout but works well enough. Some printers produce elongated printouts as they don't reproduce the same dimensions in both directions. *Tabs* can compensate for this by printing a test square. By measuring the resulting printout and feeding the actual dimensions back into the program, *Tabs* can modify the dimensions of the nets it prints to take account of any discrepancy.

The models produced by *Tabs* need a bit of modification during construction. The main culprits are the tabs themselves, which are sometimes too deep for the thickness of the object inside which they're meant to stick. You'll also need to watch the size, as some of the nets can print out too large to fit a single sheet, while others are too small to make up without the fingers of an elf.

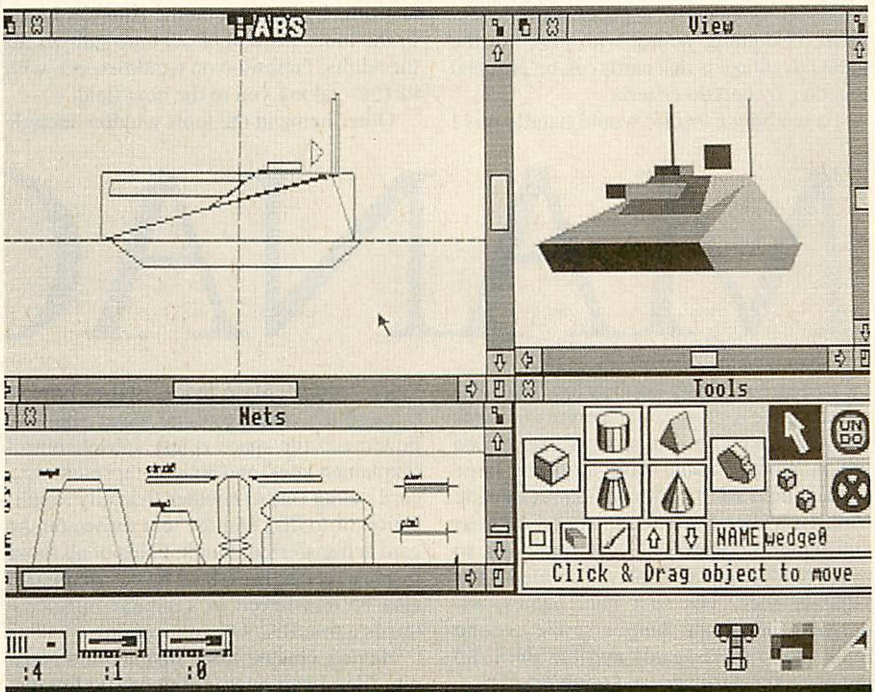
Conclusion

Tabs is a departure from other 3D packages on the Archimedes in that it can be used for a wide variety of solid modelling tasks. As well as obvious uses by modellers and in the CDT curriculum at school, it has applications in a number of different teaching and recreational areas.

The program is not protected in any way, but this is only licence for the product you buy, not a copy in the normal way. This means you can't freely transfer *Tabs* to a third party, or sell it secondhand.

Tabs is slightly limited by the complexity of the objects it can generate and the two dimensional editing system is not as intuitive as it might be. But it is a versatile and powerful program, unique in its class, which should suggest uses to virtually anyone who has the chance to try it.

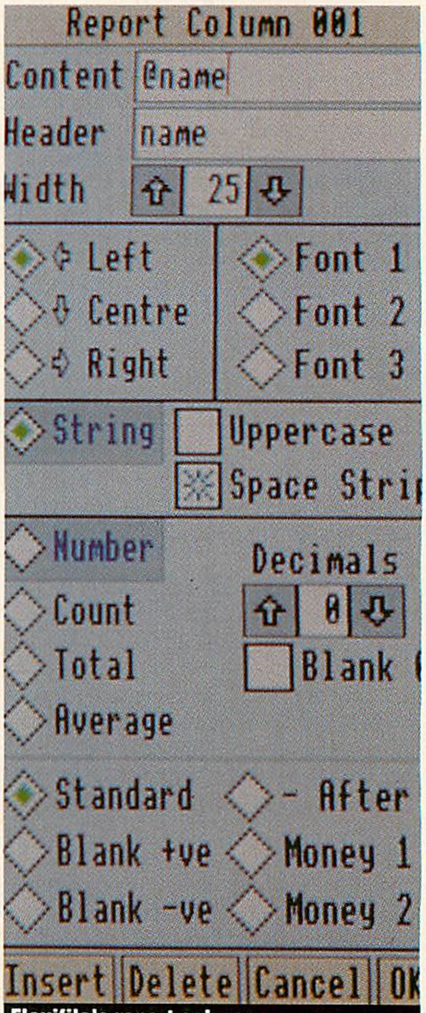
The basic single user Tabs *licence is £109.25, with a site licence costing £322. The latter version is fully networkable. Both versions are available from ExpLan at 34 Drake Gardens, Tavistock, Devon PL19 9AT.*



The edit, view and net windows can all be displayed at once

WELL MANAGED

JAMES STAPLES examines the latest thing in database managers from Minerva



Flexifile's report column

Flexifile is a database management package for the Archimedes and A3000 computers from Minerva Software. It is a multi-tasking Risc OS application which runs easily from floppy disc, and costs just under £150.

Data management is traditionally keyboard based but a surprising amount of work is performed by mouse in *Flexifile*. Mirroring the ease of use and speed of the desktop can only be a good thing but *Flexifile* springs several other pleasant surprises.

To understand the thinking behind this application it is necessary to understand a little about databases. A database is a collection of data – these are disc files in this case. A database manager is a device to manipulate the data.

Many people still use paper card index files, usually kept in a box with alphabetical dividers. Details are written by hand onto a card which is then filed manually. *Flexifile* takes this card approach but it can instantly change the card order. Cards can be sorted into sets by name, town or any criteria that appears on the card. If you have the latest type of BT exchange, *Flexifile* can even dial a phone number for you.

Many people use a software database in a similar manner to a paper card index. There is nothing wrong with this, but the great advantage is that cards can be grouped together by certain criteria.

To see how *Flexifile* would handle this I created an imaginary application. This was to record the sending and receiving of cards and presents on birthdays, anniversaries and at Christmas. I could have used one large file and held all the information on a single card. However, I wanted to access address and phone numbers all year round so, to avoid cluttering the display, I created three separate files. The first held names, addresses and phone numbers, the second tracked Christmas cards and the third did the same for birthdays and anniversaries.

Creation was a relatively simple process taking about an hour of mostly mouse based work. In creation mode a desktop window is opened onto the screen. Background text is typed directly onto the window and this text is the same on every card ('name:' or 'address:'). Next come the fields; these provide the space to type in individual entries for each card (when the file is in use they are shown as grey boxes). A field can be specified as a key field so it will be searched during a 'fast find' operation. This finds one card very quickly and more than one key field can be specified per card.

I mentioned that the displayed order of cards can be easily changed. It is during creation that this option is set up – by surname or by town are two common examples. Minerva calls this 'indexing' and it could raise eyebrows among some database users, as many packages re-order the cards by means of a time consuming card sort. Although a card sort is possible in *Flexifile* it is easier to set up several indices.

Once created, a file can be opened in two ways: by double clicking on it or by dragging it to the *Flexifile* icon. The latter allows allocation of extra memory which speeds up many operations. Like *!Draw*, *Flexifile* has a tools window attached to the main window. A new card can be added at any time by clicking on the Add Card icon in the tools window. Data entry allows all the editing facilities you would expect, with RETURN taking you to the next field.

Other items in the tools window include video recorder-style icons used to browse through the cards, a usage meter showing how much file space is left, subset control (explained later) and an icon representing a card – drag this to another 'friendly' application or to disc and the text shown on the card is transferred. Single fields or all those inside a rectangle defined by the mouse can also be transferred in a similar manner – this is a true Risc OS application.

Having created three distinct and separate files I can now introduce file linking. This is why *Flexifile* is a 'relational' database manager. A relationship is set up (by using the mouse) between the main file and another to be linked to it (in my case by name). *Flexifile* then finds a match between the two and automatically displays the correct card in the linked file. I was able to create a separate file of birthday presents and connect it to my file of friends' details.

A search expression might read @town="*LOUGHBOROUGH*" AND @name="*SMITH*". This finds occurrences of Smiths in Loughborough but only two words need to be typed to form the expression, the rest

is either dragged from the card itself or selected by clicking on the icon. To search through 100 people to see who had sent a Christmas card in 1989 took about 30 seconds from floppy disc.

The cards found during a search are grouped into one of 24 subsets (these are saved automatically when a file is closed). Selecting a subset displays only those cards matching the search criteria – this also extends to reports.

Flexifile outputs via reports. There are five types, each catering for different requirements, anything from card summaries to the complex paged report – which can produce one report from two linked files and even subtotals numeric fields.

Two nice reports are the formula report which produces output suitable for mailshots, and the label report, which prints address labels. When printing, unwanted fields may be suppressed by defining a format which displays the card in a different layout.

This would be the time saver for my imaginary application which, incidentally, didn't make use of pictures on the cards. Each card can have its own sprite and Minerva provides an example file of cities with their location shown on the map.

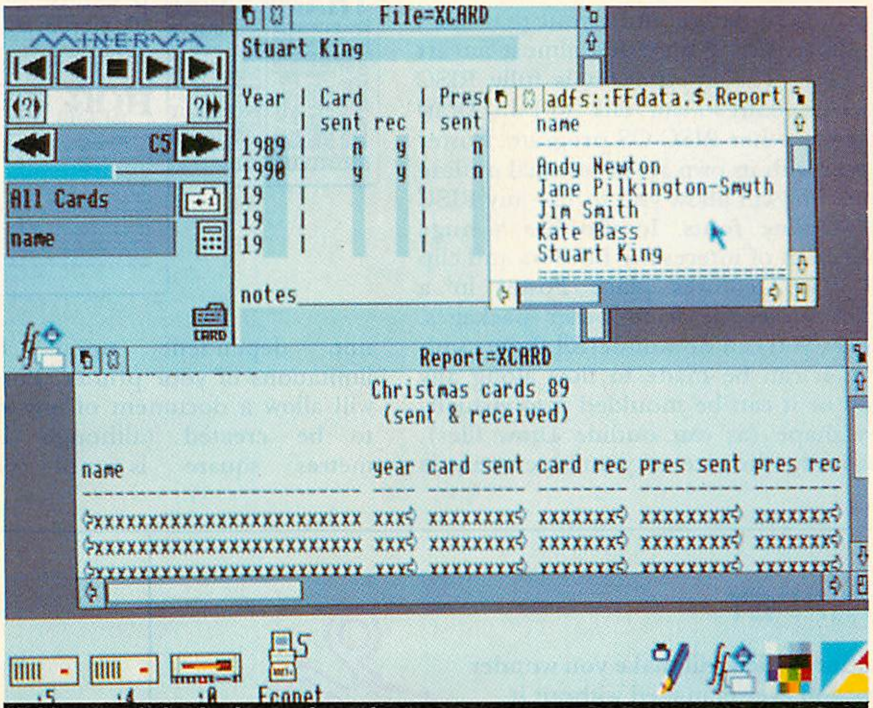
Lastly, extensive macro support is provided for users with some programming knowledge. These macros have a Basic-like structure and operate from within *Flexifile* to perform alterations to cards. Further to this, in the *Flexifile* directory is a Basic program called *BaseLib*.

Even long functions and procedures can be appended to this and then referred to by name from within the macro. This greatly increases the possible uses of *Flexifile*.

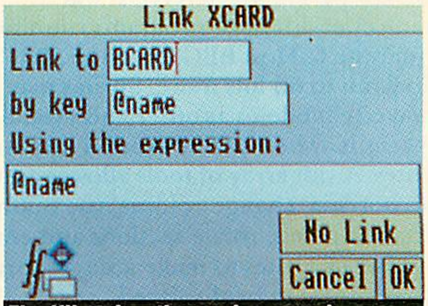
Congratulations to Minerva – it evidently considers the manual to be part of the product rather than an afterthought and it shows.

The best recommendations for this software will undoubtedly come from future users, although they will probably be in education, sport/social clubs or be personal users. Software like this gives the Archimedes great credibility.

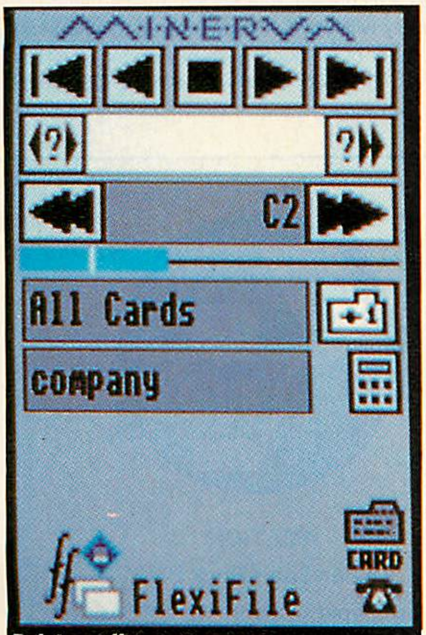
Flexifile *costs £150 and is available from Minerva, Minerva House, Baring Crescent, Exeter, Devon EX1 1TL.*



Multi-menu choice is clear and concise



Flexifile takes the card approach



Pointers offer easy access

FLEXIFILE OR MULTISTORE?

Flexifile is essentially a cut down version of *Multistore* (see *BAU* March 90) which received much attention, some of which was due to its £300 price tag. So why is *Multistore* twice the price? *Multistore* does all that *Flexifile* does, but the latter is piracy protected – backups prompt for the original issue disc. An unprotected *Flexifile* is available at extra cost.

Access to *Multistore* files can be restricted by password. *Flexifile* does not have this facility (and cannot open protected files). Most organisations holding data must, by law, register with the Data Protection Registrar. The Data Protection Act demands a high level of security for data and in implementing this, passwords play a vital role.

Extra facilities to order and group cards are available to *Multistore* users. Filters and numeric subsets act a little like indices and ordinary subsets where specific data is numeric. This would be useful for any decimal or integer field such as age, months of the year or price ranges. These act in conjunction with ordinary subsets.

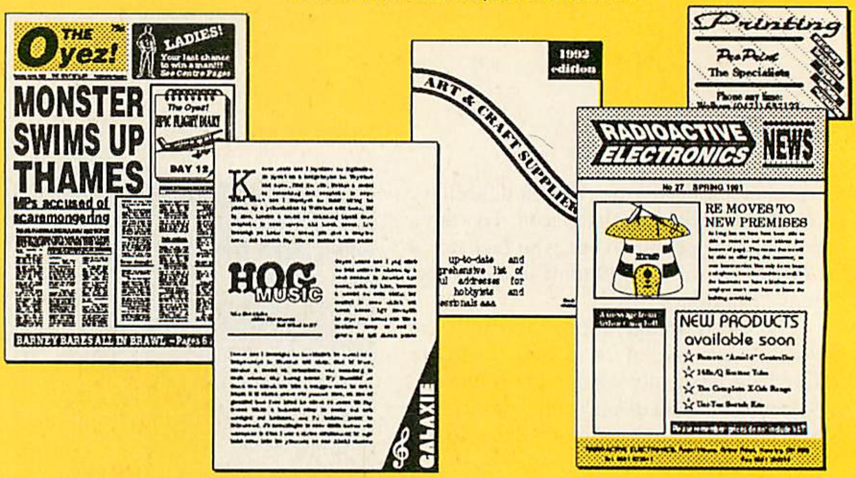
Multistore has an additional background sort but it is frustratingly slow. Sorting a file is less important with indices but a background version becomes usable on an Archimedes 540.

Students of complexity will be happy to know that *Multistore* can carry on linking until you run out of files or run out of Archimedes. Files can be linked to previously linked files and so on. *Flexifile* allows one file to be linked to another but that is the limit.

Multistore has an 'inexact' fast find extension – a single card may be found when the match is not perfect. Less important is the dedicated wordprocessor report for setting up mailshots. The same output is achievable with the formula report, so this is more a convenience factor.

The most important difference between the two packages is definitely password protection. Archimedes and their resident hard discs do get stolen and so do floppy discs. If you are required to register under the Data Protection Act you are at liberty to hold almost any true and honest data – but that data should be protected.

POSTER



created with POSTER, EDIT and DRAW

An object-based DTP package which allows you to do far more than create posters. In fact there isn't much in the way of DTP design and layout that can't be done with Poster. It's almost an art package. The application is fully RISC OS compliant so can 'talk' to Edit, Draw and any other RISC OS program. Poster comes with its own set of unusual outline fonts but will allow you to use any RISC OS outline fonts. It also has a huge collection of interesting borders and clip art. Two features place Poster in a different league from other packages. Firstly, you can do wonderful things with text. It can be made to flow along any path or it can be moulded into virtually any shape (as can outline Draw files). Secondly, the size of your document is not dependent upon the limitations of your printer. Poster will allow a document of any size to be created (although 100 metres square is not very practical). It then prints the document in sections which can be cut and assembled using the trim marks. Poster documents may be used in other DTP packages.

SNIPPET



A utility which will make you wonder how you ever managed without it. Snippet will allow you to print or save any part of any screen. It will even cope with most programs running under the 65Host BBC Emulator. But Snippet will allow you to do lots more. Sprites may be converted from one mode to another and even 8 bit BBC screens may be easily converted into Archimedes sprites. A vast array of tools allows you to trim sprites, add borders, change colours, use outline fonts to add text, edit pixels, rotate sections and combine any number of sprites to make a single sprite. A carousel allows sprites to be displayed.

ALSO...

JIGSAW — allows sprites of any size to be converted into jigsaws with real jisaw-shaped pieces. It comes complete with a set of pictures including some by the well–known artist Rodney Matthews.

JIGLET — the version for younger users. It has fewer pieces and a more appropriate set of pictures.

CRAFTSHOP 1 and CRAFTSHOP 2 — programs allowing those with limited artistic ability to create some stunning results. Both packages are currently in use in thousands of schools and homes.

COPY PROTECTION

We believe that Archimedes users should be able to:



- **install software onto hard discs easily**
- **make as many copies of discs as required for their own use**

Therefore we do not:

- **make discs impossible to copy**
- **issue site licences at three, four, or even more, times the single–user price**

We have a single price. Discs may not be copied until they have been initialised by entering an ID (such as a name). A registration card bearing the ID is returned to us. This not only assists us but also helps to ensure the security of users' copies.

"RISCOSITY"

We also believe that Archimedes software should comply with RISC OS guidelines. We have a large number of products currently under development. All of them will be RISC OS compliant.

	£
POSTER	89
SNIPPET	29
JIGSAW	29
JIGLET	29
CRAFTSHOP 1	29
CRAFTSHOP 2	29

PRICES: include P&P
include site licence
exclude VAT @ 15%

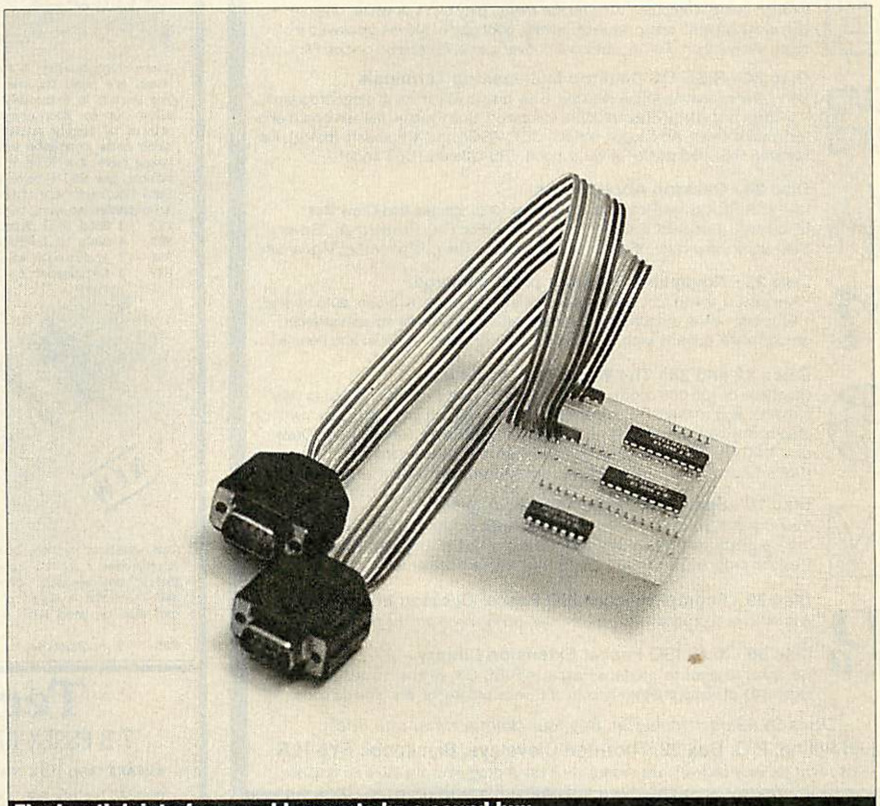
4MATION
Linden Lea • Rock Park
Barnstaple • Devon • EX32 9AQ
Tel: (0271) 45566 Fax: (0271) 22974

MAT TIZARD tries a peripheral which allows you to use your joystick with, or instead of, your mouse

STICK WITH IT

New from RTFM comes a joystick interface for the Archimedes. For your money you get a small circuit board with two joystick inputs and a disc containing conversion software which allows you to use the joystick with games that do not have the option built in. Compared to some of the other interfaces on the market, this board fits into the Econet socket on the motherboard of your Arc or A3000. This means that you don't have to sacrifice the use of the mouse or have a serial-port upgrade fitted in order to use it. This is a considerable boon, and a novel use of the Econet socket.

The circuit-board uses up most of the spare room inside an A3000, but leaves plenty of space in any other machine. By the time you read this though, the manufacturers will have miniaturised it to the exact same dimensions as a standard Econet board. Only A3000 owners can have the two joystick ports fitting snugly into the back panel, everyone else has to leave the cables dangling out of the back, under the casing. A standard switch-type joystick can be plugged into each of the two sockets; I've been using a Quickshot II Turbo, and this performs perfectly well.



The joystick interface could prove to be a sound buy

When inserting the interface, I had to gently bend the two power leads connecting with the main board. If the idea of fiddling about inside an expensive, 32-bit micro seems daunting to you (as it should), and if you are not absolutely confident you should always refer to your local dealer to fit any extra hardware for you.

The software allows you to run 14 specific games, and a routine, *Customize*, to allow the joystick to simulate keypresses. This means that, with a little programming knowledge, you can use a joystick to control aspects of your own software. This routine will also allow you to use any game which does not reset the computer when loading, but since there are hardly any that don't, this option is largely redundant.

It should be stressed that this interface is not a way of replacing the mouse (like the Delta Cat Mouse Eliminator joystick). However, the main Arc games producers are incorporating code into their products to allow you to use this board with their games. All Fourth Dimension games since, and including, *Nevryon* are compatible, as are all Krysalis games (eg, *Mad Professor Mariati*, or *Manchester United Football*) Of course, all RTFM games (like *Slappit* or *Pon!*) are compatible too. This should become progressively more common, until every new game has a joystick option.

The other titles which the supplied software caters for include the following (with some comments on their performance with a joystick):

- *Caverns* – Impossible (but then it's tricky to play at the best of times!).
- *E-Type* – Quite good, but the joystick doesn't allow you to impart sudden changes of force as you can with the mouse. This leads to frequent spin-offs and high garage bills.
- *Ibix the Viking* – Perfect for use with a joystick.
- *Interdictor 1 & 2* – Good, feels more like a plane, but as with *E-Type*, occasionally you want to give a little extra turning or climbing speed, and this isn't possible.
- *Pipemania* – Perfect, adds greatly to the atmospherics.
- *Pacmania* – Good, like an arcade game.
- *Manchester Utd* – Ditto.
- *Chocks Away* – Good. Better handling than with *Interdictor*, but this is because the game is slower anyway.

You get the general idea – games which have relatively simple up, down, left, right and fire/jump keys benefit from using the joystick, but those which require subtle changes of force or direction tend to be better played via the mouse or keyboard. Some games are not worth trying to convert; for example, *Apocalypse* just has too many keys!

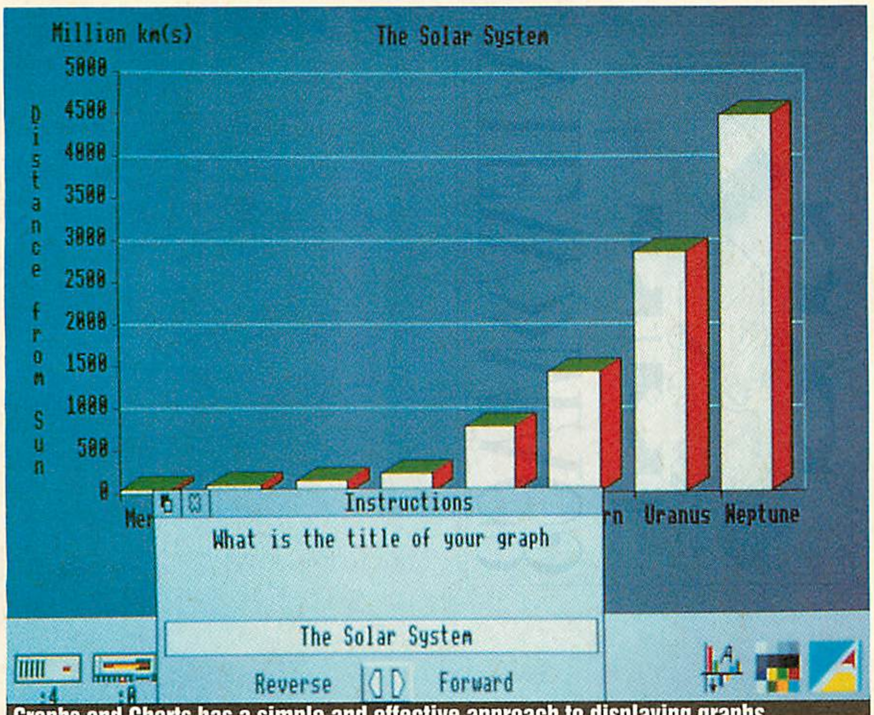
It has to be said that the joystick has been largely superceded by the mouse. Joysticks by comparison are positively cumbersome, whereas mice are far more responsive, sensitive and versatile, but there are certain applications and games for which the joystick is ideal.

Even so, I would say that this product is slightly overpriced, since it currently has limited practical use. However, if the manufacturers regularly update the conversion software and provide free upgrades to purchasers of the interface, then it could prove to be a very sound buy indeed.

The Joystick Interface, *£34.99 from RTFM, 43 Hill Street, St Helier, Jersey JE2 4UA.*

CHART SHOW

DAVE FUTCHER has been busy plotting the primary possibilities of new presentation programs for the Archimedes and A3000



Graphs and Charts has a simple and effective approach to displaying graphs

The BBC A3000 and Archimedes series of micros already have two very good presentation graphics packages – *Presenter* from Lingenuity and *Graphbox* from Minerva.

Now there is a third, *Graphs and Charts*, which unlike the other two, has been particularly designed for use in primary schools as a teaching aid to support the delivery of attainment target 13 of the maths National Curriculum – handling data.

Data handling has great potential for cross curriculur work in both the primary and secondary school and *Graphs and Charts* will ensure that data handling is carried out effectively and closely linked to IT.

However the program's use can and will extend far beyond its original design for education. Especially as it offers any BBC A3000 user a very cost effective graph and chart drawing package that is considerably cheaper than the £50 price tag of *Presenter* and *Graphbox*. The software is supplied with a directory containing 12 demonstration files which show the possibilities, and a 14-page manual which provides an adequate description of the program and how you use it.

Designing a graph or chart could not be easier with *Graphs and Charts*. You open the directory viewer for the disc and double click the Select button over the *Graphs and Charts* icon. The axes appear on the backdrop and the instruction window automatically opens. As you answer the displayed questions the graph is drawn in real time.

Everything is taken a step at a time, you are asked for the title of your graph, the title of the x-axis (absissa), the title for the y-axis (ordinate), the units to be displayed on the y-axis and the number of items.

This is then followed by a request for the names for each of the items. With the labels created there is then a request for the values.

There's a good clear input system which is easily understood and followed. Revising entries is not a problem either, as any data previously entered can be altered by clicking Select over the forward or backward arrow icons and returning to the question and altering the input.

When you click Menu anywhere over the backdrop while the axis of a graph is displayed the graph type menu is displayed. *Graphs and Charts* offers Block, Bar, 3D Bar, Bar-line and Line.

A pictogram option is at present greyed out, showing there may be expansion planned.

The graph type menu allows the user to change the format of the graph to any of those available at anytime. This is useful for children wishing to look at the possibilities of different types of graphs for particular needs.

The graph type menu is also the way to print completed graphs or charts. When the Print option is clicked, a window opens with the message 'Drag the sprite icon to the printer driver while *!Paint* is resident'.

Sadly this action provides merely a dump of the screen containing the graph and the computer's icon bar.

While this is probably acceptable for primary schools, a means of printing just the chart is needed.

It is also not possible to load the saved *Graphs and Charts* files into other packages such as a desktop publishing or wordprocessing application and with programs like *Pendown* and *Impression* being used in schools, this is essential.

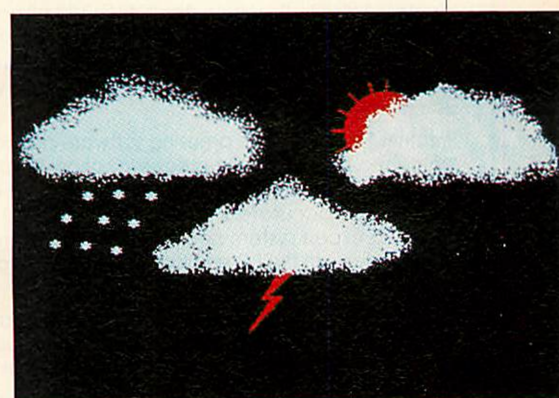
Graphs and Charts has a simple and effective approach to the task of displaying graphs and charts on the BBC A3000 or Archimedes. Do not expect any possibilities for displaying several graphs together or options for embellishing – this package is plain and simple. It will however appeal to many users – business and home as well as schools – because of its low price.

Its slightly non-standard use of the backdrop in displaying graphs can be excused, as it does allow the fullest use of screen above the icon bar.

However, the printing option needs to be improved and the application would benefit greatly if it could save the graphs produced in sprite format.

Graphs and Charts *costs £19.95 and is published by Computer Tutorial, Semarket Hill, Cowes, Isle of Wight PO31 7TR.*

CLOUD NINE

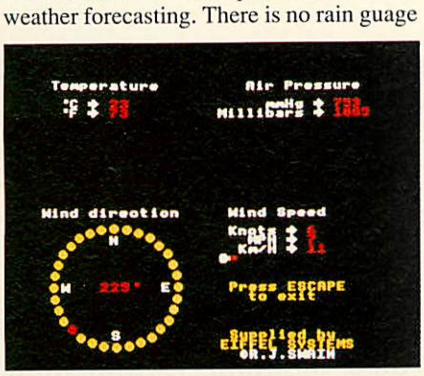


MALCOLM BROWN casts his eye over the software that could turn your BBC micro into a weather station

The established way of predicting the weather involves storing, retrieving, correlating and comparing lots of data taken over long periods of time, making it an ideal occupation for a computer. However, actually gathering the data is more tricky so only now has a reasonable attempt been made at providing the BBC micro with a complete weather station add-on.

Eiffel Systems has brought out an interface box with a pressure sensor built-in, a separate wind sensor, a separate temperature sensor and software on disc.

Here lies the first problem for real weather forecasting. There is no rain guage



(a pretty easily computerisable instrument) nor humidity sensor (again, relatively easy to implement but humidity sensors of any accuracy are extremely expensive). For £234 for the full package, maybe at least one of these should have been included.

The wind sensor has an anemometer to measure wind speed and a vane to measure the wind direction. Both use a moving magnet operating tiny 'reed' switches which the computer can detect.

The whole unit should ideally be installed 10m above the ground, facing north. Eiffel has sensibly made the unit fit a standard 3/4in TV aerial mast so it can either join your present antenna on a mast offshoot or have a new mast erected especially for it.

Either way, all the fittings for its installation are readily available and a professional aerial installer could handle it with ease. A whopping 50m of cable is provided to connect the wind sensor unit to your micro.

The temperature sensor is a simple analogue component and comes on the end of about 10m of cable and this is installed outside and out of the sun (if there is any).

Both cables connect to the interface box with screw terminals and a short length of ribbon cable from this plugs into the analogue/joystick port.

Apart from getting up ladders, fastening bits to walls and the like, installation couldn't be easier. It took about an hour to get the review system up and running.

The software is in three main sections: a realtime display of all readings, a datalogger and a data retrieval and display program.

The realtime data display is the most immediately interesting. The screen displays all four measurements at once. Air pressure is given digitally in mmHg (millimetres of mercury) and millibars, temperature in 0C and 0F, wind speed is shown graphically with a bar and in knots, miles per hour and kilometers per hour and the wind direction is shown graphically on a compass (with 32 divisions) and the exact angle in figures.

This is in itself quite fascinating to watch for a while and would be a good demonstration tool for geography classes without investing in a Stevenson's Screen.

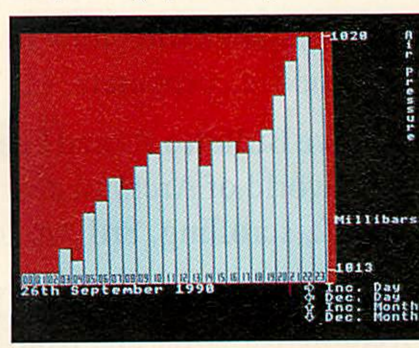
The datalogging program first requires a data disc to be created. A whole year's data is stored on one disc (in fact a little over a year, so you needn't rush to the computer instead of the party on New Year's eve).

The year, date and time are entered and the logger started. It then records the weather data every hour in an internal store. Up to 50 days' data can be stored in the computer's Ram and this can either be saved to disc whenever the fancy takes you or an autosave facility will do it for you once a day (at 11.00 o'clock in the evening).

The stored data can be displayed either on a printout in one continuous stream from any date of the year, or graphically on screen a day at a time.

Unfortunately, you cannot go straight to the day you want but you must step through the whole year, at least a month at a time, redrawing the graph each time.

There is also no way to combine graphs of wind speed, temperature and pressure nor any way to access the wind direction information along with the graphs. Graphs can be printed out on any Epson compatible printer although the whole screen rather than just the graph area is printed.

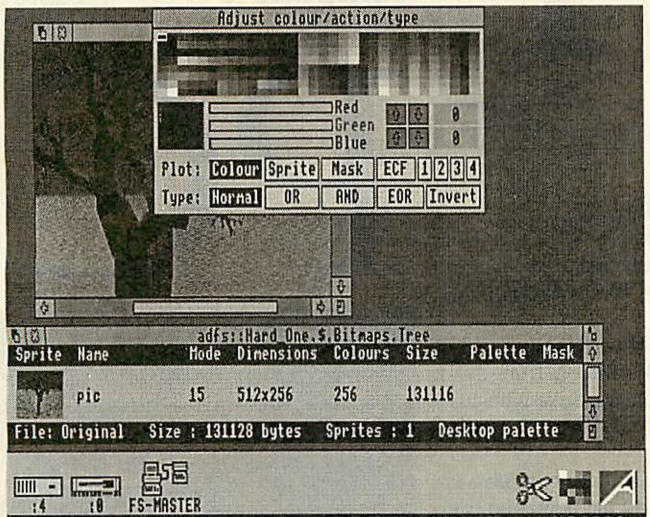


The hardware side of the Eiffel weather system is beautifully made and functions extremely well. It is a shame more thought was not put into the software. A more complete data analysis and database package is needed and many users would like to have easy-access basic data reading routines to incorporate into custom written software.

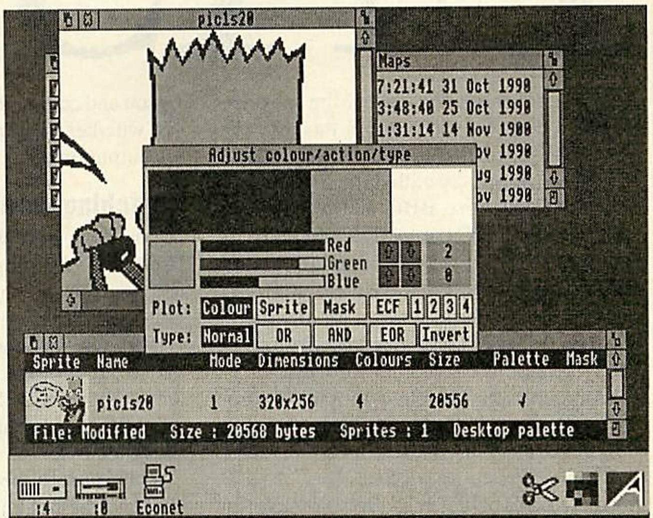
As the cost of the hardware is about £50, and the software is not so good, £234 is steep. But if you want a weather station for your Beeb, the Eiffel is your only choice.

The Weather Station costs £234 from Eiffel Systems, PO Box 59, Ashford, Kent TN23 3EB.

ALL CUT UP



Snippet: simple but good value for the Archimedes and A3000...



...but you can load your BBC screens too

PAUL JAMES chops out the blurb and discovers the true merit of 4Mation's sprite editing package

The single disc with the *Snippet* application comes with a horribly illustrated manual (someone's over-using the brilliant *Poster* program). Users of *!Paint* won't need to consult the manual too often, however, because *Snippet* seems to have taken the tactic of expanding on *!Paint*. It even points sprite files to themselves, thus when double clicking on a familiar sprite file, *Snippet* appears instead of *!Paint*. I found this annoying and I duly changed it by taking *!Edit* to the *Snippet* !Boot file.

Snippet behaves exactly like *!Paint*. When you drag a sprite onto the distinctive scissor icon, a window with your sprite(s) in it pops up with information. This method of displaying sprite information clutters up the screen – what was wrong with a menu-accessible dialogue box for each sprite?

Double clicking on a sprite brings up its edit window. From here *Snippet* duplicates 99 percent of *!Paint*'s functions, providing only a few extra of its own.

Selecting a tool from *Snippet* can be frustrating. Unlike *!Paint*, a tool box window isn't used. Instead, *Snippet*'s tools are divided into five separate menus – a brush menu, a shapes menu, an area menu, a sprite menu and a text menu.

Each of these have several items, which makes the selection of your tool cumbersome, as is searching through them to find out which tool you are currently using. However, via control key shortcuts you can, for example, draw a circle using CTRL-C. But if you are using other applications which also use hot keys, there is the danger in a multi-tasking environment that other applications may claim them.

I like the text utility which allows you to use anti-aliased outline fonts. However, the block copy and block rotate both have a programming flaw. When the area you are copying to overlaps the area you are copying from the result is a nasty mess, caused by the lack of a copy buffer. This renders this utility unusable for fine adjustments.

Strangely, the palette dialogue box is found within the edit submenu. This is one of the most annoying features of *Snippet*. When the pointer moves off, it vanishes (I bet you thought lessons had been learnt from *Artisan*). This unannounced departure can cause many a flood fill to be misdirected, and many a hair to be pulled out. *Snippet*'s zoom box uses a rather nasty percentage zoom rather than the ratio type used in *!Paint*, more flexible, but needlessly so. The most useful screen editing feature of *Snippet* is the ability to redefine the pointer so that it includes the co-ordinates within the sprite, either in pixels or OS units. There is, however, no guessing where the centre of that circle or edge of that rectangle is.

Another useful facility is the ability to save compressed files. The compression module is moderately efficient – I managed to squeeze a complex 320K sprite into half its size. *Snippet* can also save sprites in *Jigsaw* format. You can convert sprites from one screen mode to another and can load BBC screen files – two essential utilities.

Also with the package comes the *Snippet* module. Loading this enables you to freeze the computer while you take a 'snapshot' of the screen, much like 4Mation's successful *Snatch* utility for the Beeb. This is the first time I've seen this implemented on the Archimedes and very useful it is too.

So, what is *Snippet* useful for? Well, you can easily grab screens from an application to provide a tutorial, along with *Snippet*'s carousel function which can display sprites in a directory, one at a time. It can be used for grabbing screens from packages that don't generate sprite files – *!Draw* for example. By holding down the two ALT keys you can specify which part of the screen you want to use, then you can print or save it as a compressed or normal sprite. Pressing ESCAPE returns you to what you were doing. This functions reliably, except the print option doesn't seem to work properly. Most games can be 'grabbed' and there are no problems with desktop compatibility.

Overall *Snippet* doesn't provide anything new. As far as multi-tasking applications go I feel it takes a small step backwards, and it hasn't bettered *!Paint*. It simply collates a few common sprite utilities and puts them under one menu. However, the low price tag, which includes a site licence, still makes it good value for money.

Snippet *costs £33.35 from 4Mation Educational Resources, Linden Lea, Rock Park, Barnstaple, Devon EX32 9AQ.*

EASY PC

DAVE FUTCHER checks out some of the software that is available for your PC compatible BBC Master

I still think that one of the most exciting products Acorn has ever developed is the 80186 co-processor – commonly called the 512 board – which gave BBC and Master 128 users a PC compatible upgrade.

There is plenty of PC compatible software which runs with ease on the 512. However, there hasn't been a lot of support for BBC PC users who need specialised or utility programs for their co-processor.

One company has concentrated on providing this support – Essential Software. It has developed an interesting and varied range of software for all 512 users.

There are modules that allow you to print the screen, others save the screen for use on the BBC micro, there are Ram disc utilities, a pair of utilities that allow complete access of the BBC micro from *Dos Plus* and there's even a pop-up notebook.

Some packages, like the *Ramdisc*, are pure Dos, while others, like the *Command Mouse Driver* and *PrtScrn*, use the BBC Ram and so do not reduce the 512's available memory. Others, like the pop-up notebook and the fast boot program, require BBC sideways Ram.

Printing screens

All PCs have a PrtSc key which allows the screen to be printed. This useful facility enables the contents of a disc directory, a database record or text in the middle of a wordprocessed report to be printed at will.

Essential Software's *PrtScrn Utilities* sets out to fill this gap in the 512's capabilities. The package consists of three print screen programs *GrDump*, *PrtScrn* and *FaxPrint*.

GrDump will print anything on your screen in any screen mode, though it is most useful for graphics displays, to give shaded printer dumps of two or four-colour screen images. It's ideal for business graphics, CAD or art and design packages.

For printing 40 and 80-column text screen displays, *PrtScrn* is provided. This is ideal for printing text fast. But if you are looking for a harder, more precise printout you need to use *FaxPrint*. This is ideal for screens where there are mixed text and graphics displays. This program manages to adjust the printer's line spacing to close up gaps between lines which normally spoil the appearance of mixed text and graphics prints.

All the *PrtScrn Utilities* are hot key controlled and are configurable for standard Epson and compatible nine and 24-pin printers, whether they are emulating IBM graphics output or not.

Snatching screens

If you have ever wanted to save a screen from *Dos Plus* programs and print them or use them in the native BBC environment, you need *ScrnSave*.

This will save any *Dos Plus* screen image to either of the BBC micro's filing systems, ADFS or DFS, on any drive with any valid filename of up to six characters and a sequence byte.

This is useful because the screen save is triggered by hot keys, so the operation can be performed from anywhere in Dos including graphics packages, wordprocessors or the command line.

Ram discs rule

A program called *Memdisk* is supplied with the 512 board for creating a Ram disc. But because of its unrealistic 90K memory overhead it isn't really useful. Essential Software has developed *Ramdisc Utilities* which includes a memory efficient Ram disc which uses a 1K overhead!

When a Ram disc of less than 96K is required, the program reconfigures Dos' Ram drive to use 1K blocks and the directory size is reduced to 32 entries.

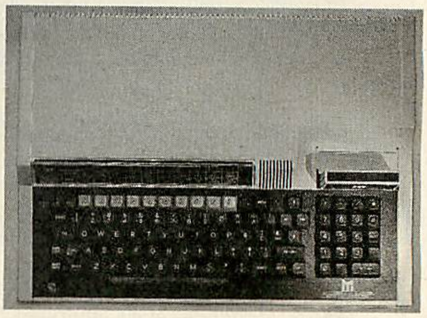
Two other programs accompany the Ram disc. The first, *Amnesia*, deletes the Ram disc without the need to re-boot the system providing the Ram disc is empty. The other is *DiscID*, which allows any drive identity to be changed to any other drive ID.

Mouse driving

Programs that run from the *Gem* desktop can use the mouse supplied with the Master 512. However, those programs that use a Microsoft or compatible mouse will not be able to use the Acorn mouse. This is because a suitable driver was never supplied by Acorn with the 512 because of hardware and software limitations.

Essential Software's *CLMouse* is unlike a standard PC mouse driver. Instead it works on the command line or anywhere the keyboard can be used.

CLMouse is not a Microsoft compatible mouse driver and it does not require packages to be configured to use a mouse. This approach means that any program can be used with a mouse. SHIFT and CRTL work



with the mouse, giving super fast scrolling. The two mouse buttons are configured as RETURN and ESCAPE by default, but can be user assigned. Mouse sensitivity has been considered too and settings can be saved to disc for future use.

Key redefinition

If you don't like the current key assignments in programs you are running on your 512 you can change them with *Trnslate*.

Trnslate is a key definition program providing facilities for defining or re-defining user-nominated keys to generate other key entries by an accompanying program called *TransDefs*. This allows changes to be implemented and saved for future use.

Translation can even be provided for the numeric keypad not present on the BBC model B/B+ as well as PC keys like Scroll Lock which are normally not available in the BBC 512 system.

Miscellaneous

The so called *Miscellaneous Disc* contains a wealth of material and, depending on your interest in 512 computing, there will be something of use in the 26 files included!

Anyone interested in enhancing their 512 with sound will find *Sound* which allows full access to the BBC micro's sound facilities from Dos. *Envelope* is a complementary program allowing sound envelopes to be defined from Dos.

If you want to change the glaring background screen glare of some packages like *Gem* or *Wordperfect*, you need *ColorDef*.

This is a screen colour definer module which replaces the orginal Acorn *Colour* utility.

There are also useful programs like *Suspend* that pauses the 512 while you have a coffee, and *Lock*, which secures the working session with a password.

Intercom is a command-line processor which provides the facilities of both a command editor permitting wordprocessor-like editing of Dos commands as they are entered, and a command archiver providing storage and recall of commands for re-issue or further editing.

Among the original software supplied with the 512 board was a potentially useful but flawed utility called *Star*, which let you pass commands to the BBC micro.

SuprStar is an outstanding upgrade for the original *Star*. It provides access to, and control of, all host star commands. Like most Essential Software packages it's accessed through hot keys, the default being SHIFT-CTRL*. Unlike *Star*, *SuprStar* maintains a separate virtual screen for 'star' operations, and when you enter the routine you see a true BBC mode 7 screen.

The limitations of *Star* are avoided by *SuprStar* because of its approach to Mos support. No longer do you have to be on the command line to use a BBC star command. The great advantage of *SuprStar* is that it does not destroy your Dos screen, even if you are in a four-colour graphics mode.

Essential has decided to take links to the native BBC mode even further by publishing a companion program called *GoBBC* which has to be used in conjunction with *SuprStar*. Amazingly it provides a full BBC environment from Dos and a safe return at any time. This is achieved without closing down and rebooting the 512.

Conclusions

Essential Software has developed a more than useful range of software that really does support the 512 user.

Those utilities that replace original Acorn ones do so in style, especially those which allow the use of the BBC micro from *Dos Plus*. Modules like *PrtScrn* and *ScrSave* provide users with useful missing functions.

All the packages have been developed with considerable care and precision, and mix and match rather well, which is due to the programming skill of the authors.

RamDisc Utilities *costs £14.95*. PrtScrn *costs £14.95*. ScrnSave *costs £9.95*. Key Translation *costs £14.95*. InterCom *costs £12.95*. Miscellaneous Utilities *cost £11.95*. SuprStar *costs £14.95*. GoBBC/512 *costs £19.95 or £14.95 when purchased together with* SuprStar.

All software for use with the BBC 512 board running Dos Plus. *Software available from Essential Software, PO Box 5, Groby, Leicestershire LE6 0ZB.*

MASTER 512 TECHNICAL GUIDE



There is no doubt that the Master 512 was and still is, an excellent idea. PC compatibility for the humble Beeb provides the hobbyist and educational user the chance to run professional software such as *Lotus 123* and *Wordstar*.

Unfortunately the documentation for it was notable for its lack of information. Dabs Press has addressed the needs of 512 users by producing two books, the excellent *Master 512 User Guide* published last year and now the long awaited *Master 512 Technical Guide*.

The *Master 512 Technical Guide* is written by Robin Burton of Essential Software and Beebug fame. As you would expect from somebody with Robin's background, the 400 plus pages of the book are packed with technical information – including the official Acorn circuit diagram for the Master 512 co-processor.

This is definitely not a book for beginners. Having said that, the style is clear and easy to read, if the reader is not put off by the necessary technical jargon.

The first chapter is devoted to an overview of the Master 512 system. It reviews the peripherals, such as screen, discs and printers, that may be used with the 512, and points out any pitfalls.

By contrast, chapter two is devoted to the 80186 processor, although PC users will find that much of the information is equally applicable to the 8086/8088/80286/80386 devices fitted to their machines. The 80186 register set is detailed and its addressing modes are described in some detail. Obviously this depth of information is of most use to the assembly language programmer.

The book continues in a technical vein to include examinations of the Firmware, Tube, Disc structure and a long-awaited explanation of *Dos Plus*.

One section of the book deals with improving the performance of the 512. This explains how to achieve a 20 percent speed increase for the co-processor, instructions for adding a low cost hard disc to Master machines and a 1Mb memory upgrade card which can be built by anyone with rudimentary electronics knowledge.

It is a good idea to feature a hardware project in a book like this. Unfortunately, while construction is comprehensively described in the text there is no accompanying circuit diagram.

This is a very odd omission, especially as there does appear to be an error in the component listing. A circuit diagram would have made this error clear and would, I suspect, have saved a lot of frustrated telephone calls.

An optional disc is available with the book. This contains several pieces of useful software including the famous *A86/D86* assembler/disassembler. Remarkably, the disc also contains Richard Russell's *BBCBasic (86)* which at a normal retail value of £100 makes the additional £5 charged for the disc an real bargain.

Over the years, Dabs Press has earned a well deserved reputation for producing books that are well written, friendly and informative. This book has only two of those attributes. The highly technical style marks the technical guide as a reference book rather than light reading.

While each topic is treated clearly and concisely, the reader is obviously expected to have some basic knowledge of computers in general, and either the 512 or PC systems in particular. I suspect that any attempt to make the book more 'user friendly' would have either reduced its usefulness or doubled its length.

There is more information of interest to both BBC and PC users in this book than I have found in specialist manuals costing twice as much.

Overall, an excellent reference book of the quality we have come to expect from Dabs Press. Highly recommended for both 512 and PC owners who wish to be more than passive users.

Geoff Cox

The Master 512 Technical Guide *by Robin Burton £14.95. With* BBCBasic(86) *and* A86/D86 *disc £19.95.*

Companion volume The Master 512 User Guide *by Chris Snee £9.95. Both available from Dabs Press, 22 Warwick Street, Prestwich, Manchester M25 7HF.*

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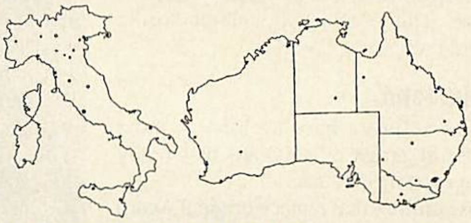
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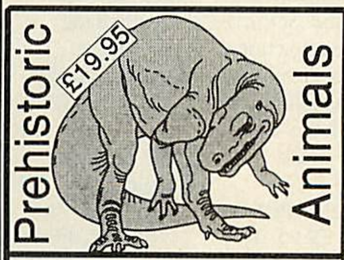
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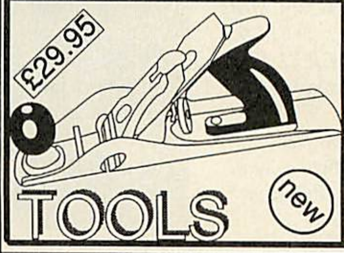


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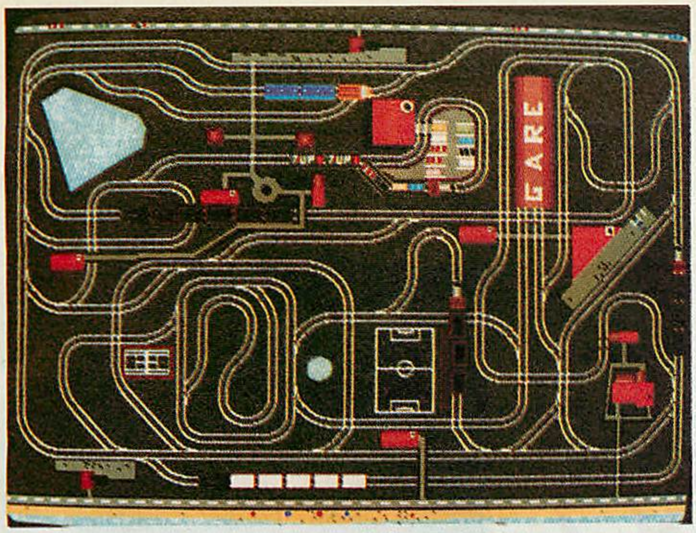




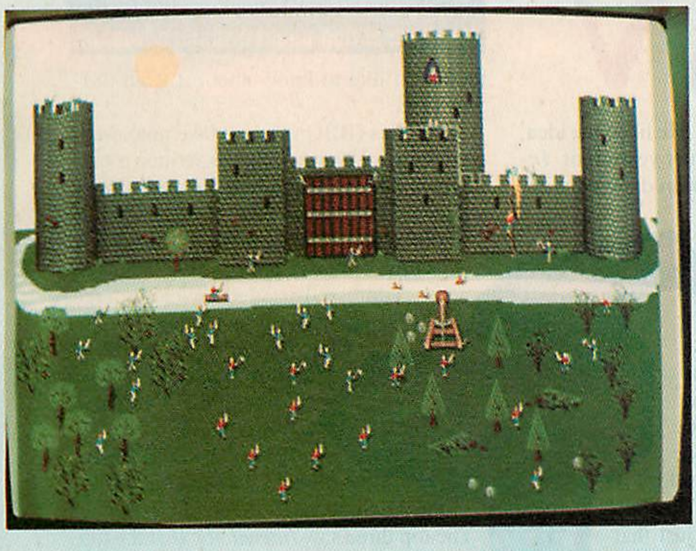
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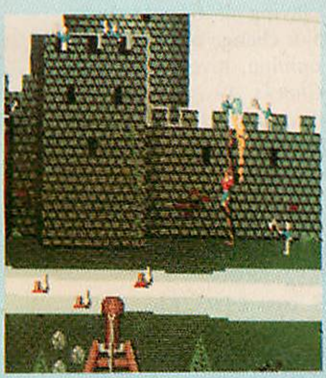
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Not recommended for those with a weak heart or of a nervous disposition!

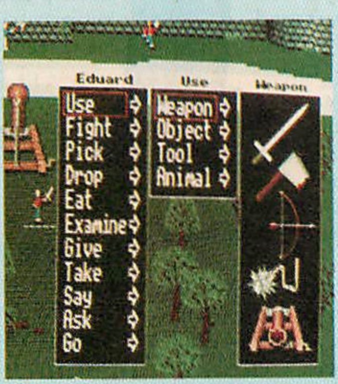


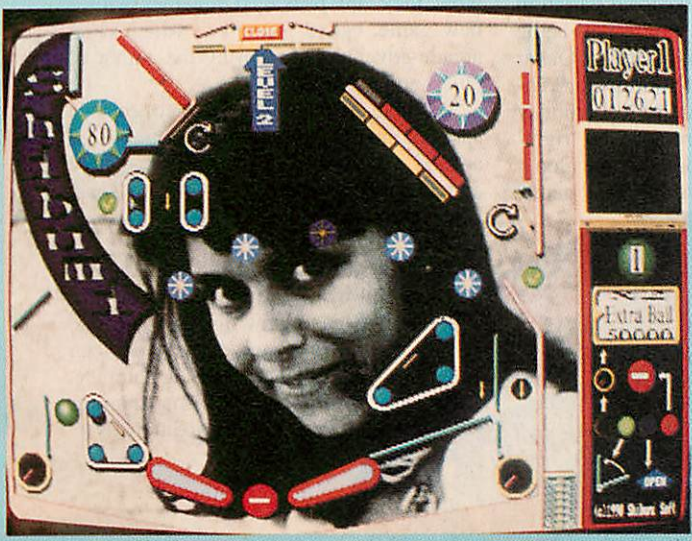
Siege



It is the year 1247. You must rescue lovely Princess Alexandra who has been kidnapped and locked up in the high tower of the black castle.
With the help of your brave men you try to save her so you can marry her, be the future King of England and live happily ever after (and have many children).
You can try to get into the castle many different ways, but whether you swim across the moat, cut down trees to make a bridge, scale the walls, dig a tunnel, smash your way in with heavy stones flung from a catapult, or just use the catapult to fling yourself in, many of your man will die before you succeed.
Several levels of exciting medieval fights, in a game that combines clever strategy with very fast action.
Swords, axes, arrows, hot oil and other medieval weapons will be used against you, so Shibumi Software can assume no responsibility for any injuries inflicted while playing this game.







ArcPinball

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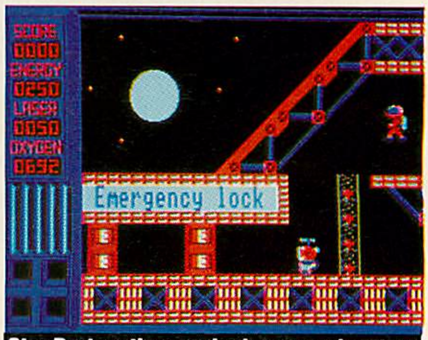
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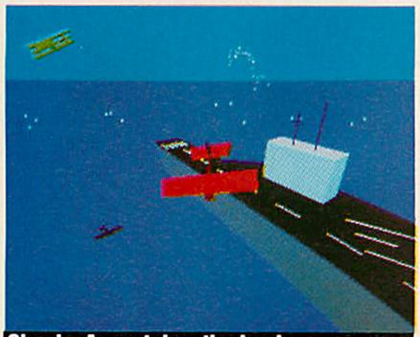
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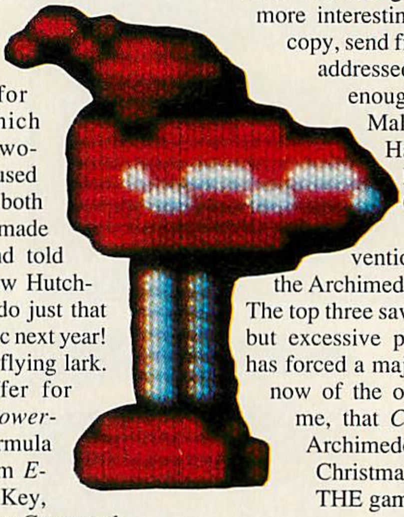
Star Port: action-packed space adventure


Chocks Away takes the lead

The Arc is flying high this Christmas. Clares' *Interdictor II* simulates a modern jet fighter with dead(!) accuracy, while the Fourth Dimension's *Chocks Away* has already won my undivided attention during the past few weeks with 'souped up' Tiger Moths. I'm content but somebody's not. Hopefully this year, but probably early next, *MiG-Fulcrum* from Domark will hit the shelves. It is being written by Simis, the team responsible for *Interdictor II*, and is played from within the cockpit of the Soviet MiG-29. There are several missions, based in the Arctic, on the Soviet-Chinese border and there's even one in the Gulf, though this may be changed in the light of current events. The game is being developed on the Arc for the 16-bit machines, which isn't unusual, but for once it has been decided to release the Arc version along with the others.

Back to *Chocks Away*, some advice for mission 19. Don't shoot the patrol boat half way to the top right target on the map, else you'll find yourself staring at the familiar windows and icon bar of the desktop, due to a frustrating bug in the software. Leave the boat well alone, or you'll regret it!

In the new year 4D will be releasing another set of missions, with different planes and more varied tasks. I really enjoy the two-player feature, so I suggested it as a challenge to Chris Tubbs at Simis, possibly for *Interdictor II*. He liked the idea, and revealed that an Econet version of *Interdictor II* has already been dabbled with. I also spoke to Mark Botterill at the Fourth Dimension and suggested a parallel port/ Econet link-up for *Chocks Away*, which would enable the two-player option to be used with two computers, both at full screen. He too made interesting noises, and told me that author Andrew Hutchings is attempting to do just that for the new mission disc next year!



But enough of this flying lark. What else is on offer for Christmas? Well, *Powerband* is the new Formula One racing game from *E-Type* author Gordon Key, and will join *The Wimp Game* and *Break 147* among the Fourth Dimension's Christmas offerings.

Audiogenic presents Emlyn Hughes' *International Soccer*, which has occupied the 16-bit charts for 68 weeks, and is now available on the Beeb. It has been written by the author of *Helter Skelter* (reviewed last month), and its play is not dissimilar to *Arcade Soccer* or *Superior Soccer*.

Ballarena, the latest *Breakout* variation from French company Sisteme, is now being marketed by Arxe Systems in Britain. Onkar Jagpal at Arxe is interested in good Archimedes games, and has said he's got money stashed away ready to promote the 'right' game if and when that should come along. If you've written or are writing 'that' game, then he'd like to know about it. Call 081-534 1198.

UIM fans (BBC version) take note. Malcolm Gray of Northwich has written a save position editor allowing you to alter money values and change data to make the game more interesting to play. To receive a copy, send five pounds and a stamped addressed padded envelope large enough for a 5.25in disc to: Malcolm Gray Software, 19 Hadrian Way, Sandiway, Northwich, Cheshire CW8 2JR.

Finally, I would unconventionally like to alter part of the Archimedes Top Ten of last month. The top three saw *Interdictor II* at the top, but excessive playing of *Chocks Away* has forced a major change of mind. I am now of the opinion, love me or hate me, that *Chocks Away* is the best Archimedes game yet. Have a good Christmas and get your hands on THE game. Now!

Sam Greenhill

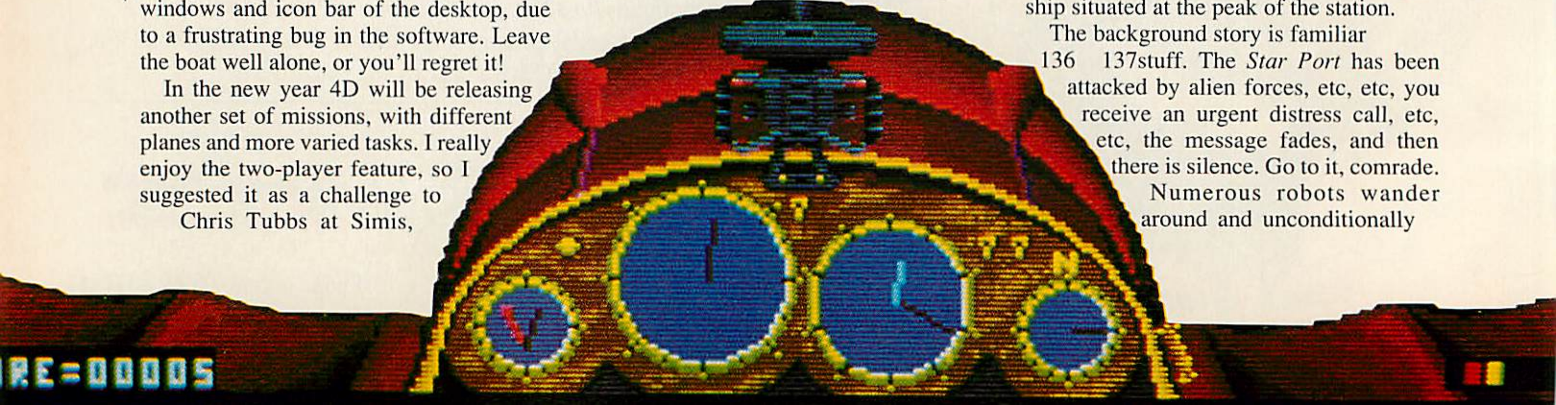
Star Port: Play It Again Sam 14

Superior, tel: (0652) 58585
BBC disc £11.95, cass £9.95, Elec £9.95, Compact £14.95

When you buy *Play It Again Sam 14* you get *Ballistix*, *Predator* and *Superior Soccer*, all of which were medium-quality standalone games when they first came out. Now they are packaged together with a new game, called *Star Port*, which is an arcade-adventure written by the author of *Quest* and *Camelot*.

The object of *Star Port* is to collect five cases of medical supplies which are dotted around a triangular-shaped space station, and then escape using a conveniently spare ship situated at the peak of the station.

The background story is familiar 136 137stuff. The *Star Port* has been attacked by alien forces, etc, etc, you receive an urgent distress call, etc, etc, the message fades, and then there is silence. Go to it, comrade. Numerous robots wander around and unconditionally





start shooting manically if you show your face. Show your gun instead. Exploration can result in some confusion because of the 'triangularity' – I keep getting lost. When you find you can go no further because of a blue door, it is time to put your thinking cap on.

The other face of this game is the complex puzzles which must be solved to advance a level. They consist of four interlocking wheels, each of which holds four equally spaced letters. The wheels can be rotated, and the object is to end up with all nine letters in consecutive order. I tell you, it's one of those puzzles whose difficulty varies exponentially with the proportion completed. In other words the last letter is a real pain, just like the last square in a Rubik's Cube. And there's a time limit!

Sensibly, Superior has not attempted to release *Star Port* as a separate title, and it sits quite comfortably with its companions on the compilation. As arcade adventures go, *Star Port* is easy – I've heard that the author can complete it in under 30 minutes.

Sam Greenhill

Drop Ship



Drop Ship deserves to do well

Fourth Dimension, tel: (0742) 700661
Archimedes £19.95

Now this is more like it! A brilliantly addictive game which really makes you want to barricade yourself into a room for a week in order to finish it. Those of you who have played *Rotor* on the Arc will be familiar with the game-play, which is also similar to that of the old BBC game, *Thrust*. You pilot a highly manoeuvrable, circular craft which is influenced by a gravitational pull which is about half that of the Earth... but who said anything about Earth!

Your task is to recover the power crystals from a rapidly overheating nuclear reactor in a Martian colony. You also have to avoid its automatic defence systems which have gone haywire, and to top it all, some unfriendly aliens have moved in while nobody was looking. The graphics and animation really are superb. Your drop-ship rotates smoothly and is extremely responsive – a burst of thrust which goes on a fraction of a second too long can send you careering into the wall. You have to put up with self-aiming gun turrets, artificial gravity generators and swarming defence droids which are all out to get you. The backdrop is that of a slime-ridden technoplex, brimming with pods which swell and burst 'Aliens' style. When you successfully destroy something, credits are released which you can collect and use as money.

Between each of the 15 levels you can do a little shopping to refuel your craft or upgrade it with some of several gadgets available which include a wing gun and extra firepower. Passwords are given every three levels so you don't have to start at the beginning every time. The main complaint I have is that the screen scrolls room by room instead of continuously. What would have been better (and I'm sure it's possible) is a sort of centralised scrolling where the background follows your ship and not the other way round. Otherwise, this is a first rate game and deserves to do well.

Mat Tizard

Bug Hunter In Space

Minerva, tel: (0392) 437756
Archimedes £17.95

At the start of the game, Repton himself makes a surprise guest appearance, only to be squashed by a one ton weight. This short statement resounds throughout the game for *Bug Hunter in Space* makes *Repton* seem like a short stroll through a patch of polystyrene rocks.

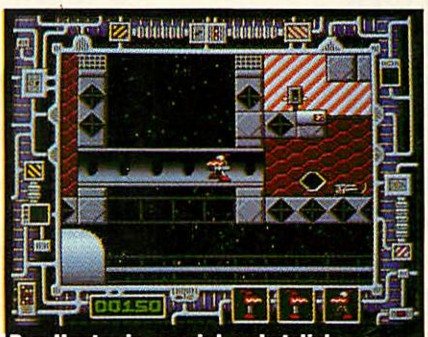
With a ba-doing! the star makes his first appearance and begins his little dance, moonwalking along the screen and jiggling in time to the tuneless, but cute, music.

The story? Aliens have formed a fleet just beyond the Earth, waiting for the moment to attack. The earth federation decides against nuking the fleet and sends in our rather helpless looking hero instead. With substantial help from you he must kill the slimies and shut down the ships engines, rendering the fleet harmless.

In the final stage of each level you must set off a chain reaction to blow the central power plant, destroying the ship. Make sure you've got your exit well planned of course, or you go up with it.

The sound, well I turned that off and listened to a CD, nuff said about that. However the graphics are so cute you'll just want to hug them. Parallax stars float behind the windows in the ship and little aliens busy themselves in keeping the fleet moving. The puzzles are of the highest quality and I can't help wanting to solve them, no matter how many attempts it takes, and believe me, it takes quite a few.

This game is something special. It's not taxing the Archimedes but it shows a finesse and style that's rare. For old *Repton* hacks like me it's a very welcome change as the puzzles are very different, not to mention pleasingly (im)possible. I love this game so much that I refuse to see the codewords. Oh well, it's 4am and I've got to finish level 16 by bedtime, time to go.



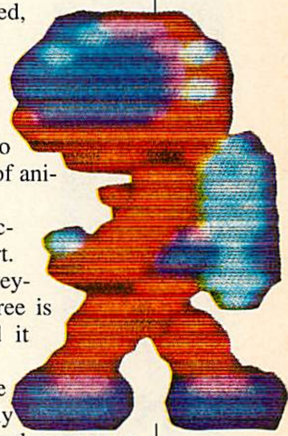
Bug Hunter is special and stylish

Paul James

Archimedes Hostages

Superior, tel: (0652) 58585
Archimedes £19.95

Hostages on the Beeb was reviewed in September, and explained how the mission before you is to assault a terrorist-saturated embassy and rescue numerous hostages. The Archimedes version has exactly the same plot but the graphics and sound have that extra oomph.

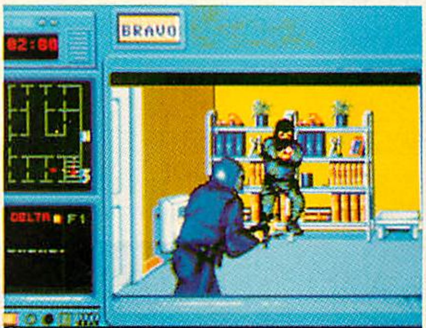


The sprites are very detailed, especially once inside the building, though you could be forgiven for thinking the hostages themselves are all related. While the graphics do look very pretty, the speed of animation is a bit course.

It could have been perfection with a bit of extra effort. The sound is alright, but the keyboard response on level three is so aggravating that I find it virtually unplayable.

I'm tending to point out the minus points, and these only deduct from a reasonably good game overall. I have mixed feelings, but found Arc *Hostages* was basically fun to play. It's certainly good value for money.

Sam Greenhill



Hostages: good value and fun to play

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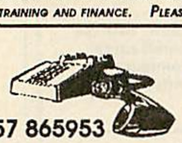
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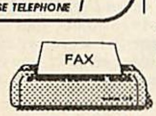
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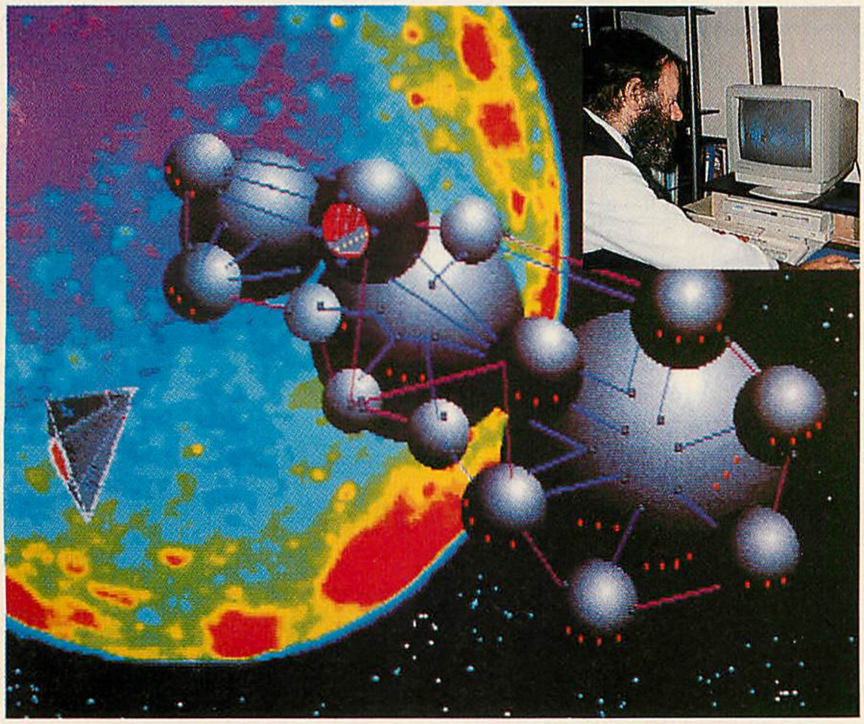
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ACORN USER ADVERTISEMENT PAGES - JANUARY 1991

LIGHT LIFE

CHRISTINA NEAL finds out how the Archimedes fits into a well-lit graphics company



You don't need to be a telly addict to recall the striking advert for the London Electricity Board. The swift transformation of a grey, gloomy London into an illuminated picture at the mere flick of a lightswitch is sure to remain in viewers' minds long after it has left their screens.

Given the sophisticated graphic portrayal of London, computer enthusiasts could easily assume that it was produced on an expensive workstation. Nonetheless, the images in the advert were produced on the Arc 310 using Clares' *Proartisan*, by freelance designer and photographer, Anthony Matthews.

Initially, Anthony was approached by Paul Gerrado of the Broad Street Agency, the firm employed by the LEB to organise the campaign.

'Paul showed me a mock up of what their artists had done and I was asked to do three different views of London', he says.

Anthony's creation of an illuminated capital virtually started from scratch. First, he had to photograph the Thames. Then he transferred the photo into his computer via a Philips CC TV camera, before digitising it with a Watford digitiser. This gave him the freedom to 'play' with the picture on-screen, adding a selection of colours to provide the illuminated effect. The end result was saved to disc and posted to the Broad Street Agency.

However, his use of the Arc for business doesn't end there. His much-loved machine can also produce a varied selection of greeting cards which he sells in bulk to the British Museum and a number of retail outlets, under the umbrella of his home-based firm, Pixel Graphics. Indeed it was this business venture that put him in touch with the LEB, as Paul Gerrado 'just happened to spot a Pixel Graphics card in a newsagent and liked the design'.

As with the LEB advert, the cards can be produced from an original photo taken by Anthony, or from drawings created on-screen. One card that has proved particularly popular depicts a colourful image of the moon, amid an array of solar planets. Anthony explains how this was produced:

'I used my video camera to photograph the moon one evening, and then transferred it onto my machine. All I had to do after that was add the colour and the solar planets (see main picture), which are really a number of sprites'.

Obviously, the features of *Proartisan* have proved invaluable for his work. But that hasn't stopped Anthony from adding some of his own utilities to enhance his artistic creations.

'I've added a program for manipulating an image once it's on the screen. It can cover something with dots or lines and enables you to look at an image, pixel by pixel, so that you are able to change colours randomly'.

By now, you've probably gathered that Anthony's work takes a considerable level of computing, photography and design skills. Indeed, he's come a long way since moving from his hometown of Dundee to London in the late 1950s, where window dressing was the nearest he got to design work! Fortunately, he later found a job in the design and prints department of the British Museum, and this was closely followed by computers entering his life.

'When computers came along I suddenly realised that either they had been waiting for me or I had been waiting for them' he recalls. 'Like everyone else, I started with a ZX81 before upgrading to a BBC B, which I still have and has never gone wrong'.

His venture into the greeting card industry started with a visit to the Scottish Spring Fair, a design trade show held in Glasgow. Anthony produced 24 card designs and asked show visitors to select their favourites. This gave him an idea of what the public wanted, and he's never looked back.

'My work situation is ideal really', he says happily. 'I've always wanted to earn a living from combining my interest in computers and photography, and I hope to go on doing so for a long time yet'.

Happily for him, Anthony's career looks set to flourish. Aside from his greeting card trade, he is also working on another idea for the LEB.

This time, he is using his artistic skills to draw a Santa Claus to appear in a Christmas campaign. As you've probably guessed, Santa's prime role will be to fly over Anthony's illuminated capital as seen in the original image.

So when you see Santa gracing your screens during the festive season, you'll know which machine created him!

Anthony would like to hear from anyone interested in helping him set up a library of computer graphic designs. Write to: Pixel Graphics, Pages Green Farm, Wetheringsett, Stowmarket, Suffolk IP14 5AQ. Tel: (0728) 860149.

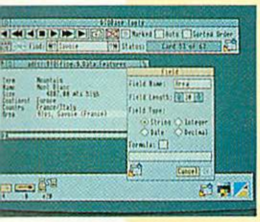
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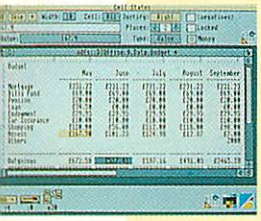


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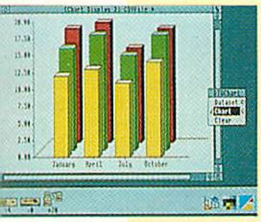
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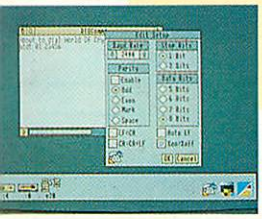
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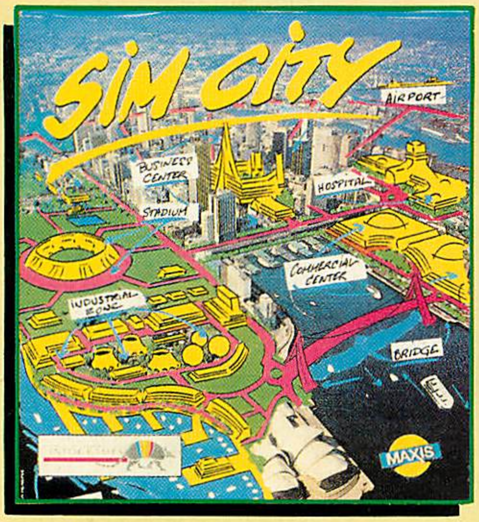
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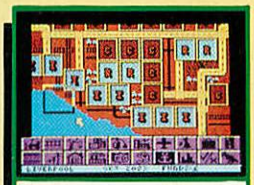
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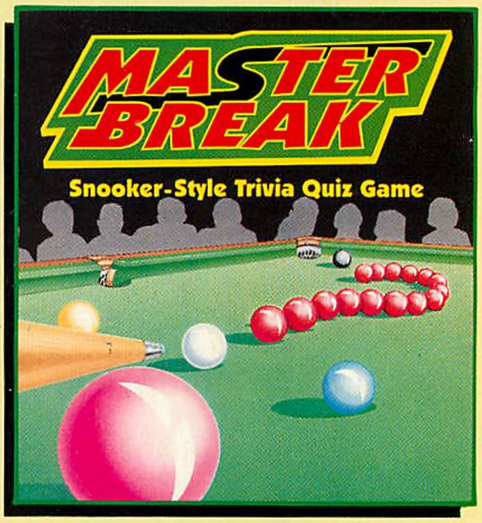
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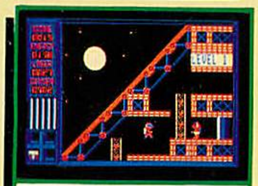
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